

Stamping out IT complexity is a priority for many of the execs attending Computerworld's Premier 100 conference. **PAGE 10** ▶

THE VOICE OF IT MANAGEMENT ■ WWW.COMPUTERWORLD.COM

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Tape Mishap Prompts Calls for Disk Backups

BY LUCAS MEARIAN

Bank of America Corp. disclosed last week that it lost digital tapes containing the credit card account records of 1.2 million federal employees — including 60 U.S. senators. Users and analysts said the mishap highlights the risk of physically moving archived data to storage facilities and will likely feed a movement toward network-based disk-to-disk backup systems.

The data loss, which occurred late last year, also prompted legislators to renew calls for national legislation similar to California's identity theft law, which requires immediate disclosure when customer information is compromised.

"The world has changed dramatically over the last four years, and the more you can eliminate the amount of data being transported around, the more you want to do that."

Tape Mishap, page 61

Companies Scramble to Bolster Online Security

BY JAIKUMAR VIJAYAN

Growing fears of identity theft and e-mail phishing scams, exacerbated by the recent data leaks at ChoicePoint Inc. and Bank of America Corp., are pushing companies to adopt new IT security tools in a bid to bolster consumer confidence in online transactions.

The latest example is ETrade Financial Corp.'s announcement last week that it is offering high-value customers a token-based form of authentication technology that can be used with passwords to provide an additional layer of protection for accessing online accounts.

The move addresses concerns about data security by giving customers a constantly changing password in addition to their static ones, said Joshua Levine, eTrade's chief technology officer.

Online Security, page 61

THE Future of IT

SPECIAL REPORT

Gary H. Anthes asked a panel of IT visionaries for their long-range views and got an earful. Read their predictions about outsourcing, utility computing and open-source software, starting on **page 27**.

■ **"Data centers a decade from now will be gone."**

- F. WARREN MCFARLAN

■ "Eventually . . . low-wage countries won't be so low-wage anymore." - THOMAS MALONE

low-wage anymore.” - THOMAS MALONE

■ **"Microsoft is running out of rich, dumb customers."** - THORNTON MAY

customers." - THORNTON MAY

■ "I'm worried about [an] Internet meltdown that causes serious economic disruption and causes people to distrust IT."

- GORDON BELL



Running IT Operations Like a Business Not So Easy, Execs Say

Pioneers cite cultural issues, learning curves

BY THOMAS HOFFMAN
MIAMI


Any small-business owner will tell you that starting and running a business takes a massive amount of work. Some IT executives who are trying to run their operations like a business are dis-

covering the same thing.

"We started a chargeback system on Day One of our services [organization], and it was miserable. We didn't really know what we were doing."

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QuickLink k1900
www.computerworld.com

said David Pelosi, an IT business partner at Public Service Enterprise Group Inc., a diversified energy holding company. In 2001, Newark, N.J.-based PSEG formed a shared-services organization that includes its IT, legal and human resources activities.

PSEG's shared-services unit has since developed a mature chargeback system for the IT services it delivers to business units. It has also built credibility with business users by benchmarking costs with ex-

IT Operations, page 16

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Premier 100 Now!

Don't miss our coverage this week of *Computerworld's* annual IT leadership conference from Scottsdale, Ariz. — including attendees blogging live from the event. **QuickLink a5200**



Together On-screen

In the Technology section: Many IT leaders, like the United Way's Elaine Mitchell Norman, are taking a front-end approach to application integration by using composite interfaces as an alternative to full-blown EAI. **Page 39**

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On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Website. Just enter that code into our QuickLink box, which you'll see at the top of each page on our site.

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THE FUTURE OF IT

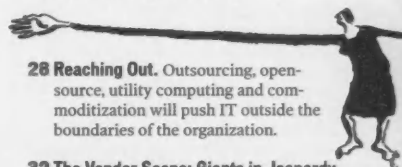
SPECIAL REPORT

EDITOR'S NOTE:

What does the future hold for IT? To answer that

question, we turned to some of the most-qualified crystal-ball gazers we know. Specifically, we asked our panel of CIOs, university professors, IT consultants and researchers about their views on the economics and delivery of IT in the future. They shared their visions of the changes and opportunities ahead, as well as some of their worries about the industry.

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AT DEADLINE

SEC Probes Execs From ChoicePoint

ChoicePoint Inc. said two of its executives are being investigated by the U.S. Securities and Exchange Commission for possible stock-trading irregularities. The probe of trades by CEO Derek Smith and Douglas Curling, president and chief operating officer, is linked to recent disclosures that the company sold the personal information of thousands of consumers to fraudulent businesses [QuickLink 52719]. ChoicePoint said.

SCO to Restate 2004 Results

The SCO Group Inc. said it will restate financial results for the first three quarters of its 2004 fiscal year because of accounting errors. The announcement comes as SCO fights to prevent a Nasdaq delisting. In December, SCO reported a net loss of \$23.4 million for 2004, a year in which it spent nearly \$20 million on legal fees in lawsuits with IBM and others.

CA Issues Software Security Warning

Computer Associates International Inc. and security firms are warning about a number of serious security holes in software that manages CA product licenses. The License and Client Server is shipped with almost every piece of software CA sells. The security holes could allow remote attackers to run malicious code on systems that use the software.

DOJ Renews Deal For WordPerfect

The U.S. Department of Justice has renewed a multiyear, 50,000-seat deal to license the WordPerfect Office 12 suite from Ottawa-based Corel Corp. The upgrade agreement extends a contract signed in 1999. The value of the deal wasn't released, but government pricing for the suite begins at \$106 per user.

Wells Fargo Web-enables ATMs

Finishes five-year migration from OS/2 to Windows on all 6,200 of its machines

BY LUCAS MEARIAN

WELLS Fargo & Co. last week said it has completed a five-year project to Web-enable its 6,200 ATMs in 23 states. The Windows-based infrastructure is designed to allow Wells Fargo to update its entire network remotely when it needs to do things like add new languages and enable customers to make envelope-free deposits.

The San Francisco-based bank said it also installed more than 3,000 online stations in its 6,046 branch locations. The WebATM machines and online stations are part of a strategy to integrate all channels — stores, phones, automated teller machines and the Internet.

Jonathan Velline, head of Wells Fargo's ATM banking, said the biggest challenge was the amount of internal software development needed to migrate the bank's ATM back-end systems from OS/2 to Windows. Another hurdle was tightly integrating the ATM back-end systems with those of other business units, such as branch and online banking.

Complete Integration

"We want to make sure our ATMs are integrated with every other channel, so when I do a deposit in a [branch], I want to be able to go to an ATM immediately and see that deposit," Velline said. A less-technical hurdle was replacing all of the ATMs with higher-performance models.

Bill Sentenac, a senior vice president of technology in Wells Fargo's services division, said the bank used J2EE to develop the middleware layer that integrates the Windows-based ATM platform with its back-end systems. The bank uses XML to communicate between various backup platforms.

Avivah Litan, an analyst at Gartner Inc., said ATM fraud will likely pick up as most banks move to Web-enabled systems, "because of the combination of stealing ATM numbers online and creating counterfeit ATM cards to use off-line." The move to Windows-based systems is "not great news for the security of the system. I'm sure there's a lot of holes that will be created because of this," she added.

Sentenac said he's concerned about the security of Windows, but no more so than he was with OS/2. He said Wells Fargo took all "the rational steps you'd take to harden any operating system," such as closing unused ports. "The reality is, you can't buy a new ATM that runs OS/2," he said.

Velline said 51% of the bank's checking accounts are accessed online, and Wells Fargo customers are conducting as many transactions at ATMs as they do with branch tellers.



WELLS FARGO claims to be the first bank to have fully Web-enabled its ATM infrastructure.

Wells Fargo claims it is the first bank to have completely Web-enabled its ATM infrastructure. According to research by Needham, Mass.-based TowerGroup, 30% of the world's ATMs will run on Windows by 2006.

Bank of America Corp. said

last week it is also rolling out Web-enabled ATMs. Its 3-year-old project has Web-enabled 3,500 of its 16,500 ATMs, a spokeswoman said.

Another benefit for Wells Fargo is that its newly installed ATMs use the Triple Data Encryption Standard, an upgrade that's now required by credit card companies and related funds-transfer networks, such as MasterCard International Inc. and Visa U.S.A. Inc. The network providers established deadlines starting last year for converting electronic funds networks to Triple DES. The current standard, DES, has become vulnerable to hacking attacks as a result of increases in computing power.

The total cost of replacing ATMs can be high. A new ATM can cost as much as \$50,000; upgrades can range from \$1,000 to \$5,000, say financial industry analysts. Hardware security modules, which sit on transaction servers and process DES keys, can cost up to \$50,000 each.

© 52963

Share Looks Back at 50 Years, Continues to Evolve

BY PATRICK THIBODEAU
ANAHEIM, CALIF.

AT THE SHARE user group's conference here last week, a chunk of big-iron history was put on display as part of the group's 50th anniversary celebration. Display cases held items such as ancient tape spools and punch cards, prompting one gray-haired systems veteran to say this about all the mainframe memorabilia: "It's a bit sad when you actually remember them."

Chicago-based Share traces its start to a 1955 meeting of aerospace techies that included workers from rivals Boeing Airplane Co. and Lockheed Aircraft Corp., as the companies were known

then. Group members began sharing IBM mainframe code, leading to the choice of the user group's name.

Fifty years later, the mainframe remains an important part of Share's focus. A hot topic among users at this year's conference was running Linux on mainframes, with many attendees saying that

they're eyeing the open-source operating system as part of server consolidation strategies.

Pat Carroll, an enterprise technical architect who works on a mainframe at a large retailer and is a 30-year Share member, said that although many companies have moved applications to distributed environments, critical databases often remain on mainframes. "There is still an interest in keeping your family jewels on the mainframe," said Carroll.

But Share has also branched out to include distributed systems as many of its members have taken on responsibilities that extend beyond managing mainframes. "All the technologies have rolled over several times, but the problems have not gone away," said Anne Calvori, a past president of Share who works as an IT manager at a company that she

MVS
is virtually
a 4 letter word

Quirky items from Share's past were on display at the conference.

Project at World Trade Center Site Puts Advanced Design Tools to Test

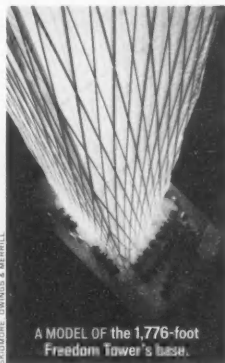
Freedom Tower architects rely on 3-D CAD, online collaboration apps

BY MATT HAMBLÉN

The 1,776-foot-tall Freedom Tower being built on the World Trade Center site in New York is pushing the boundaries of architectural engineering because of its height and complex design. It's also a major test case for a new generation of design and online collaboration tools for the construction industry.

The tower's designers are using desktop software from Autodesk Inc. in San Rafael, Calif., to render 3-D, animated images and to try to improve collaboration among some of the parties involved in the project. That isn't the mainstream way of doing things in the construction industry, which still often relies on printed copies of 2-D drawings.

The Freedom Tower's



SKIDMORE, OWINGS & MERRILL

cornerstone was laid last July 4, and precise diagrams of the building's plumbing and electrical systems, as well as detailed floor and wall plans, are now being created by architects at Skidmore, Owings & Merrill LLP (SOM) and structural engineers at WSP Cantor Seinuk, both of which are based in New York.

Adding Automation

Angelo Arzano, a technical manager at SOM, said last week that most of the hundreds of subcontractors on the Freedom Tower likely will still use paper drawings. But Autodesk's computer-aided design (CAD) and collaboration tools will help project managers schedule construction phases and can handle tasks such as automatically calculating required quantities of steel and concrete, Arzano said.

"In the old days, you would count the number of doors needed from drawings, but these tools do it for you," he said. "It takes the monotony out of it. Imagine how many doors there are in a tall tower."

One SOM architect used Autodesk's Revit building information modeling software to render a set of Freedom Tower floor plans, each with slight variations, in just two hours, said James Vandezande, the firm's CAD manager. That would have taken about two

weeks using older versions of Autodesk's flagship AutoCAD software, he noted.

In addition to Revit, SOM is using Autodesk's Buzzsaw Professional online collaboration service and its Architectural Desktop design software, which is built on top of AutoCAD. The firm customized the Autodesk products, adding features that conform to its standard design procedures, Vandezande said.

SOM also had to upgrade from a 10/100 Ethernet LAN to Gigabit Ethernet to handle the transmission of design data for the Freedom Tower. Vandezande said the firm is running Autodesk's software on Dell Inc. workstations with dual Xeon processors.

Sharon Tan, an analyst at Gartner Inc. in Stamford, Conn., said the use of collaboration tools that give participants in a building project real-time access to data is "not

widespread." Adoption will occur "bit by bit," she predicted. "As more high-profile projects like the Freedom Tower show success using these online collaboration tools, then others will follow."

Liability issues are one stumbling block to full online collaboration, said Anthony Delisi, IT manager at WSP Cantor Seinuk. The structural engineering firm is running Autodesk's software in parallel with SOM, but Delisi said that Cantor Seinuk will use SOM's online drawings only as a reference against its own renditions. "You are responsible for what you create, and you don't want to use something someone else has made and take it for granted it is absolutely correct," he noted.

Arzano said the burden of getting subcontractors on the Freedom Tower project to use Autodesk's Buzzsaw service rests with the construction manager, Tishman Construction Corp. in New York.

Officials at Tishman didn't return repeated calls seeking comment. **52927**

Software Eases Complex Design

THE FREEDOM TOWER is a complex project from an architectural standpoint, because the basic design calls for the building to twist, or torque, by 40 degrees as it rises from the ground to the 1,500-foot level, according to officials at Skidmore, Owings & Merrill.

In addition, the base of the tower will be shaped like a parallelogram to conform with street layouts. As a result of the design, each of the building's 70 occupied floors will have a different layout. Angelo Arzano, a technical manager at SOM, said Autodesk's Revit software has been an "invaluable" tool for configuring all of the floor plans. "It also allowed us to modify the floor spacing in one-tenth the time of using standard AutoCAD," he said.

One of the purposes of the building's torque is to disperse winds coming off the Hudson River. Turbines placed above the tower will use the wind to provide some electricity, and the turbines will be surrounded by steel cables meant to evoke the architectural theme of the nearby Brooklyn Bridge.

James Vandezande, SOM's CAD manager, said the firm's architects have used Autodesk's software to calculate the tension that will be placed on the cables and adjust the size of cable that's needed.

Vandezande helped develop a two-day training process to acquaint end users with the new software being used as part of the project. He said the technology has prompted some changes in the way SOM's designers work with one another. For example, teams of architects now view a large-screen plasma monitor and look at 3-D drawings to evaluate design conflicts, instead of tacking 2-D blueprints to conference room walls. "The parties can all look at one database, and there's no argument" about the information, he said.

— Matt Hamblén

NATIONALIZE
IBM

A button from 1969.

asked not be identified.

Some 2,300 IT professionals were on hand at this year's event, well below the 6,000 or so attendees who showed up at one Share conference in the early 1990s. But Robert Rosen, Share's current president and a CIO at the National Institutes of Health in Bethesda, Md., said that conference attendance is picking up slightly again and that the number of dues-paying members in the user group has remained stable at about 2,300 companies.

52972



THE FREEDOM TOWER rises dramatically above the New York skyline in this artist's rendering of the planned building.

BRIEFS

Firefox, Mozilla Warnings Issued

Several security vulnerabilities in the Firefox Web browser and the Mozilla Suite of software applications have put users of the open-source products at risk of hacker attacks, the Mozilla Foundation said. Firefox Version 1.0.1 fixes 17 security flaws in the popular Web browser. The vulnerabilities could allow an attacker to gain full control of a victim's PC. Most of the flaws also affect Mozilla.

NIST Releases Fed IT Guidelines

The National Institute of Standards and Technology released its final version of recommended security controls for federal information systems. The new guidelines will be the basis for a proposal to be made later this year by NIST for the Federal Information Processing Standard, or FIPS. The guidelines will become mandatory for federal agencies in December.

SAP Realigns Management Team

SAP AG said it is realigning the responsibilities of its management team to simplify its command structure. The reorganization comes as SAP positions itself to better compete with Oracle Corp., which recently acquired PeopleSoft Inc. The realignment affects the responsibilities of all members of SAP's executive board.

IBM Updates Informix DBMS

IBM unveiled an upgrade to its Informix database management system and plans to offer a new Express edition aimed at smaller businesses by the middle of the year. Informix Dynamic Server Version 10 includes performance, administration and security upgrades, and adds support for the Linux 2.6 kernel. IBM also laid out a road map for Informix products through 2010.

ON THE MARK

HOT TECHNOLOGY TRENDS, NEW PRODUCT NEWS AND INDUSTRY GOSSIP BY MARK HALL



Robo Admin May Not Appear Soon . . .

... but the need for IT automation technology is immediate. What with Framingham, Mass.-based market research firm IDC estimating that there are at least 20 million servers and 39 million network routers installed worldwide, you can't blame IT executives and staffers for wishing for some robotic help with

the endless, complex and costly tasks of patching software, changing configurations and provisioning systems. And all that work doesn't come cheap. IDC says companies spent \$95 billion last year maintaining just

servers. Alas, until a robotic sysadmin superhero swoops down from the skies to save the day, you'll need to rely on vendors like Opsware Inc. in Sunnyvale, Calif. According to Chief Technology Officer Tim Howes, Opsware "wants to be able to code the expertise in IT people's heads." Howes says that most of the automation tools now on the market come from server and router vendors themselves — which isn't all that helpful for users facing IT's heterogeneous reality. "We need to automate for a multivendor world, especially for networks," Howes says. Hence



HOWES
wants to code
your brain.

the planned March 21 release of Opsware's Network Automation System 4.0. Among other improvements, the upgrade can be configured to report on security violations as they relate to government regulations such as the Sarbanes-

Oxley Act. It also manages network administration workflows and automates the approval process for any changes to network gear. And Opsware has spiffed up the browser-based user interface so that mere-mortal admins don't have to install any client code to use the software. A typical installation costs \$20,000 for 50 network nodes. And, yes, the company offers a similar tool for server management.

Corporate users of web-conferencing tools . . .

... racked up 1.5 billion minutes of online meeting time in 2004.

And that's just on the service offered by Genesys Conferencing Inc. in Montpellier, France. Tony Terranova, vice president of product marketing at Genesys, says that the company is eyeing future market opportunities among midsize companies, which these days are more likely to use services such as WebEx from WebEx Communications Inc. and LiveMeeting from Microsoft Corp. A more immediate move by Genesys is this week's beta release of an online billing and reporting feature that's designed to detail things such as which department or end user is burning up the webconferencing minutes. And the company says that in Q2, its online service will fully integrate with the calendar in Lotus Notes so users can schedule Genesys meetings through IBM's e-mail software. Genesys already offers that capability for Outlook users. Also in Q2, you can expect Genesys to add support for the Safari and Mozilla Web browsers.

IT security rules modeled on . . .

... Sarbanes-Oxley may be just around the corner. Pointing to the recent security gaffe by ChoicePoint Inc., which released personal information about thousands of people to crooks [QuickLink 52787], Terry Larrew argues that the government will soon impose IT security regulations "with the full force of Sarbanes-Oxley." Larrew, CEO of Englewood, Colo.-based Vericept Corp., says, "We're only one step from what 404 is doing" — a reference to Section 404 of Sarb-Ox, which calls for companies to have an "adequate



TERRANOVA:
Genesys ups
Notes support.

internal control structure" for financial reporting. Of course, applying a similar requirement to IT security would be good news for Vericept, which supplies enterprise risk management tools and services to

large companies. But such a law would wreak havoc inside IT departments and "change the flow of dollars," ballooning security budgets at the expense of other programs, Larrew predicts. You can almost hear the smile in his voice when he says that.

Comply with regulations and save . . .

... your company time and money. Wouldn't that be nice? Well, Patrick Taylor claims it's possible if you use Oversight, his company's namesake "transaction integrity monitoring" tool. The CEO of Atlanta-based Oversight Systems Inc. says the vendor will release Version 3.0 of its Linux appliance this week. The upgrade is designed to monitor all accounts receivable and general ledger transactions and verify that each step of the process adheres to corporate policies, according to Taylor. He claims that Oversight's constant monitoring can reduce duplicate payments, redundant shipments, incorrect invoices and other money-losing miscues. Right now, Oversight's prowess is limited to the chief financial officer's domain, but Taylor envisions that it will eventually be able to monitor such things as corporate security processes. Oversight charges \$85,000 per year for each business process being monitored.

\$6-\$8

Amount spent managing hardware for every \$1 buying it, says IDC.

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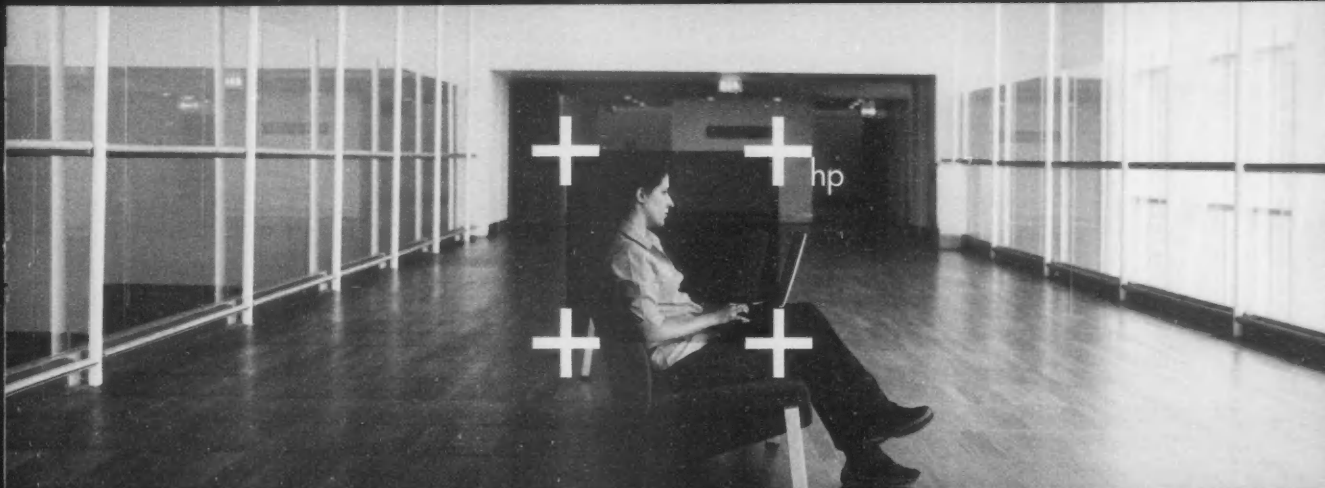
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IT Leaders Put Emphasis On Simplifying Systems

Premier 100 attendees streamline technology installations to cut costs, lighten admin load

BY TODD R. WEISS

MAKE IT SIMPLE. That concept is on the minds of many of the IT managers who plan to attend Computerworld's sixth annual Premier 100 IT Leaders Conference, which starts today in Scottsdale, Ariz.

In a survey of Premier 100 honorees and other prospective attendees that was conducted via e-mail in advance of the conference, 92% of the 200 respondents said they are actively working to simplify their IT environments.

They cited steps such as consolidating software portfolios, enforcing internal technology standards and reducing the number of vendors they deal with (see chart below).

For example,



An integrated environment is much simpler to manage and audit.

YURI AGUIAR, CTO,
Ogilvy & Mather

Yuri Aguiar, chief technology officer at Ogilvy & Mather Worldwide in New York, said the advertising and public relations firm is developing a fully integrated, J2EE-based Web services framework in order to make its IT systems easier and less expensive to manage, as well as more secure.

The standardization effort is designed to reduce the number of "silo-based" systems at

Ogilvy & Mather and ensure that all applications have common security layers, Aguiar said. "At the end of the day, an integrated environment is much simpler to manage and audit than a fragmented environment," he added.

Emcor Group Inc. CIO Joseph Puglisi said that to reduce complexity, the Norwalk,

Conn.-based mechanical and electrical systems contractor has adopted a one-vendor policy for purchases of hardware and software across its operating companies. Emcor has also installed software so it can centrally track all IT equipment and monitor systems for needed upgrades and compliance with corporate policies.

The goal is to lower costs and relieve the operating units of burdensome IT administration work so they can focus on better meeting the needs of their customers, Puglisi noted. "We should have done more and done it sooner," he said.

Rick Nolle, senior vice president of IT at St. Louis-based RGA Reinsurance Co., said he's trying to keep the insurance firm's PeopleSoft applications "as vanilla as possible to streamline upgrades and be ready for a future migration."

Another goal is to look for consistency in RGA's hardware, software and networking equipment and "get rid of all one-off solutions," Nolle said.

Panasonic Corporation of North America is using its core SAP applications infrastructure to drive standardized business processes, which simplify system configuration needs, said Bob Schwartz, CIO at the consumer electronics maker in Secaucus, N.J. Schwartz added that the company is also planning a major redesign of its supply chain systems to streamline and eliminate some redundant software.

Suchindran Chatterjee, president and CEO of Lagerfelds Sports Entertainment Complex in Phoenix, said IT simplification efforts are being driven by financial pressures. "Everything is budget-squeezed," he said. "Right now, the margins are very, very thin, so you have to save money on everything you can. That is the big motivator."

Q 52973

TECHNOLOGY PRIORITIES

What are your top **BUSINESS INTELLIGENCE** priorities this year?

- 53% Deploying rich-client dashboards
- 52% Expanding BI tools to more users
- 33% Installing business performance management software
- 25% Consolidating BI tools

What kind of **STORAGE TECHNOLOGIES** do you plan to buy during the next 12 months?

- 41% Converged NAS and SAN devices
- 32% Disk-based backup systems
- 29% Direct-attached storage
- 23% iSCSI devices

How do you expect to use **WEB SERVICES** within your organization this year?

- 69% For internal application integration
- 60% To support integration with partners and customers
- 30% To build composite applications
- 8% Don't plan to use Web services

IT CHALLENGES

What **SECURITY ISSUES** keep you awake at night?

- 62% Viruses, worms, Trojan horses and "zero-day" attacks
- 52% Software flaws and patch management
- 52% Disaster recovery
- 50% Data privacy issues
- 42% Network intrusions and application-layer attacks

What are your **TOP STORAGE CHALLENGES?**

- 55% Storage management
- 52% Disaster recovery
- 47% E-mail and instant message retention
- 31% Budget issues
- 29% Regulatory compliance

How is **REGULATORY COMPLIANCE** affecting you from an IT perspective?

- 51% It's a manageable burden on IT
- 27% It's basically under control
- 12% It's not an issue
- 10% It's draining IT resources

BASE: 200 IT and business managers who are Premier 100 honorees or have registered to attend this year's Premier 100 IT Leaders Conference. The respondents were surveyed by Computerworld via e-mail last month. Multiple responses were allowed on all of the above questions except the one about the effect of regulatory compliance on IT.

The Simple Life

WHAT ARE YOU DOING TO SIMPLIFY YOUR IT ENVIRONMENT?

- 75% Pruning unneeded software and applications
- 71% Enforcing strict technology standards
- 56% Reducing the number of vendors we use
- 39% Standardizing on a few large vendors
- 31% Outsourcing
- 31% Consolidating data centers
- 27% Using thin clients
- 21% Using application service providers

BASE: 163 of the 200 respondents to Computerworld's e-mail survey of Premier 100 honorees and other IT and business managers who plan to attend this year's Premier 100 IT Leaders Conference. Multiple responses allowed.

ONLINE EXTRA
www.computerworld.com

See more results: Visit our Web site to read the full Premier 100 survey.
QuickLink 52940

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It's Time.

BRIEFS

More Explorer 7 Details Emerge

More details about Internet Explorer 7 are trickling from Microsoft Corp. The IE team wrote on its weblog that the browser will be available for "Windows XP SP2 and later," which includes the forthcoming Windows Server 2003 Service Pack 1 and Windows XP Professional x64 Edition. The blog noted that corporations have requested that the new IE support Windows 2000 [QuickLink 52828], but no decision has been made.

IBM Services Unit Targets Small Firms

In an effort to drive more services business through partners, IBM Global Services launched several initiatives aimed at better targeting small and midsize businesses. IBM estimated that it's spending \$300 million on the effort, which includes the creation of a dedicated unit that will team with regional systems integrators in the U.S. and Europe to work on such deals.

3Com Cuts 220 Jobs Worldwide

3Com Corp. cut about 11% of its workforce late last month, the company said in a filing with the U.S. Securities and Exchange Commission. According to the Feb. 25 filing, 3Com laid off 220 employees. The company cut 100 jobs in the U.S., 90 in Ireland and 30 in the U.K. It will take a related \$15 million charge in its fourth quarter.

Intel Plans to Drop Pentium Moniker

Intel Corp.'s Pentium 4 brand, its flagship desktop processor since 2000, will be retired with the launch of the company's first dual-core desktop processor, it announced at the Spring Intel Developer Forum. The company also outlined features of its first batch of dual-core processors. Intel said Pentium D, code-named Smithfield, will ship by year's end.

Suppliers Eye RFID Data, Search for Potential Uses

Early adopters say information could drive changes in internal operations

BY CAROL SLIWA
GRAPEVINE, TEXAS

MORE THAN 100 suppliers have started shipping RFID-tagged pallets and cases to Wal-Mart Stores Inc., CIO Linda Dillman said at the RFID World 2005 conference here last week. The suppliers are able to access data about their shipments on Wal-Mart's Retail Link extranet site within 30 minutes of the tags being read, she added.

Making use of the data generated by radio frequency identification devices is expected to become a key capability for some of those companies this year, said several users and analysts. It's seen as the next step for suppliers, which until now have primarily focused on trying to ensure that tags, readers and other RFID products work.

"It really is about taking that data and re-engineering your business processes," said Mike O'Shea, director of corporate

Auto-ID/RFID strategies and technology at Kimberly-Clark Corp. in Irving, Texas. "It's not about the technology."

O'Shea said that Kimberly-Clark this year plans to examine five business processes and test re-engineered approaches that are driven by RFID data. He declined to provide specifics, but he noted that the consumer goods maker is looking into "electronic proof of delivery" and ways to use "demand signals" in product replenishment.

Tip of the Iceberg

Suppliers won't be the only ones plotting business process changes. Dillman said Wal-Mart has "just barely touched the tip of the iceberg" with RFID. Initial process changes include creating automated and prioritized pick lists for store employees to use when stock is low on shelves and products are available in the back room, plus exception reporting capabilities for when

It really is about taking that data and re-engineering your business processes.

MIKE O'SHEA, KIMBERLY-CLARK

that isn't the case, she said.

Jeff Woods, a Gartner Inc. analyst, said early-adopter retailers are being aggressive in trying to use RFID-generated data to improve their business processes. Woods added that such efforts have been more spotty among suppliers, most of which have taken a "slap-and-ship" approach — a strategy that works for them, since RFID won't help to improve their internal warehouse processes, he said.

Many suppliers have done RFID-related systems integration work, but most don't know what to do with the data at this point, said IDC analyst Richard Dean. "They're using it, but not very effectively at the moment," he said.

Kimberly-Clark receives RFID data from both Wal-

Mart and Target Corp., which has set a June deadline for its top 100 suppliers to start using RFID. O'Shea said that over the past two months, the two retailers have been seeking Kimberly-Clark's opinion on "meaningful formats" for the data. He added that some retailers and suppliers are working with EPCglobal Inc. to define parameters for exchanging RFID data electronically.

Drug maker Purdue Pharma LP began using RFID technology last year to comply with a Wal-Mart directive to tag Class 2 narcotics. Sajjan Idicula, a senior systems analyst at Purdue, said the Stamford, Conn.-based company sent its first RFID-tagged shipments to the retailer in November.

Instead of just taking a slap-and-ship approach, Purdue brought in SAP AG and Fort Wayne, Ind.-based Northern Apex Corp. to help hook into its systems the RFID data it collects internally. Purdue now feeds the data into SAP's supply chain event management module. Plans call for the data to eventually be tied to SAP's R/3 ERP software, Idicula said. **Q 52977**

PRICING PROBLEM

One RFID vendor says the cost of tags won't hit single digits any time soon:

QuickLink 52993
www.computerworld.com

SAP Buys Retek to Build Retail Business

BY MARC L. SONGINI

Looking to boost what has been perceived as an underwhelming presence in the retail market, SAP AG last week gobbled up software maker Retek Inc.

SAP said it has agreed to pay \$496 million for Minneapolis-based Retek, a developer of retail applications. The transaction could close as early as next month, said SAP America Inc. spokesman William Wohl.

Customers had varied opinions about the deal.

Robin Lynas, CIO at Mark's Work Wearhouse Ltd. in Cal-

gary, Alberta, said he is waiting to see how the situation plays out in the next few weeks, though he believes that SAP will leave Retek intact while providing "support and capital where needed."

"SAP went after a retail vertical because they don't play well there right now," Lynas said. Mark's Work Wearhouse, a retail clothing company, has been using Retek's point-of-sale software at its 320 stores for 18 months.

The Clarks Companies NA, a Newton, Mass.-based foot-

wear maker, uses Retek's merchandising system to support its supply chain and inventory management processes.

If SAP tightly integrates Retek's applications into its own ERP software architecture, it could provide Clarks with "expanded possibilities," said CIO Richard Scheerer. Currently, Clarks uses Oracle Corp.'s financial software rather than SAP's.

Wohl said SAP's move isn't specifically intended to buy market share or new customers, but instead helps round out SAP's offerings and expertise. It will also boost SAP's retail presence in the U.S., where Retek is strong, he said.

He noted that the move is not a reaction to Oracle's re-

cent buyout of rival ERP vendor PeopleSoft Inc., since most competition in the retail market isn't from those vendors or any third-party software maker. Retailers generally use home-grown systems, he said.

Despite investing considerable development resources into its retail portfolio in the past few years, SAP has been unable to grow its market share as quickly as it had hoped, according to IDC analyst Mike Witty.

He called on SAP to explain to Retek customers an "integration strategy and timeline, how overlapping functionality issues are going to be addressed and what the upgrade path will be for future releases." **Q 52951**

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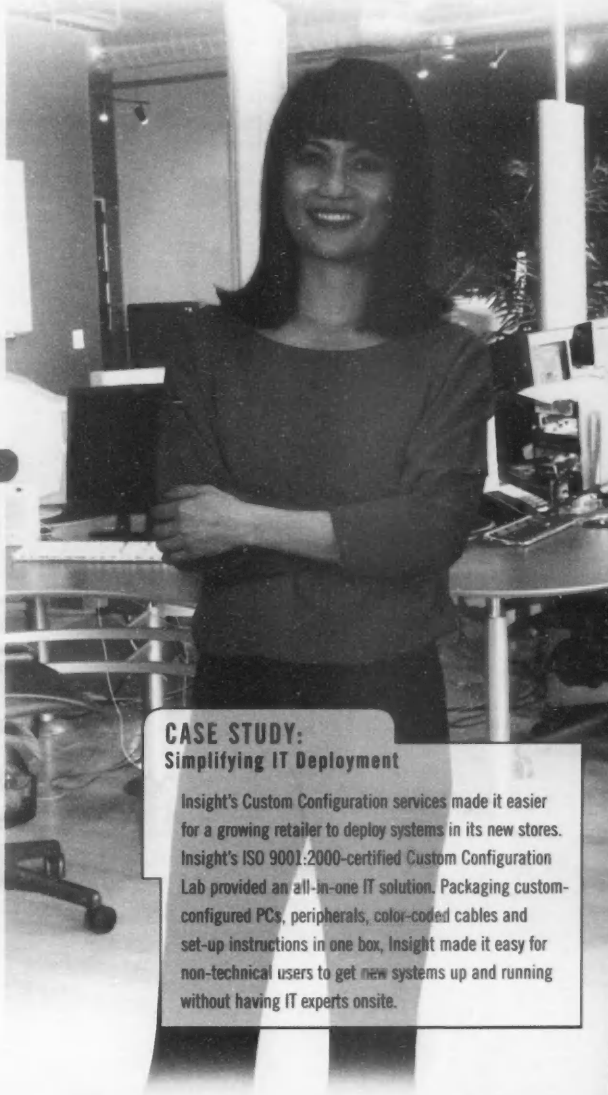
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GLOBAL DISPATCHES

An International IT News Digest

EDS Tapped for \$7.7B U.K. Military IT Upgrade

LONDON

THE U.K. MINISTRY OF DEFENCE last week selected a consortium of vendors led by Electronic Data Systems Corp. for the first stage of what's expected to be a 10-year, £4 billion (\$7.7 billion U.S.) IT modernization contract.

The contract will be awarded in stages, with the first installment valued at £2.3 billion (\$4 billion). Plano, Texas-based EDS called the initial award its single largest contract win since 2002 and said it expects to start work on the project in April, after details of the agreement are ironed out.

The goal of the project is to integrate, upgrade and centrally manage about 100 computer systems and hundreds of applications that serve 320,000 end users at 2,000 locations, a Defence Ministry spokesman said.

The consortium formed by EDS is called Atlas and includes Fujitsu Ltd., General Dynamics Corp. and junior partners Hewlett-Packard Co. and IBM. After a three-year bidding process, Atlas beat out a

rival group headed by Computer Sciences Corp.

■ LAURA ROHDE, IDG NEWS SERVICE

IT Skills Shortage Hits Aussie Agencies

SYDNEY

SEVERAL AUSTRALIAN government IT projects face delays and escalating costs because of a high-level skills shortage at federal agencies.

Centrelink, a human services agency, and the Health Insurance Commission are struggling to fill positions for senior developers and project managers on newly approved IT initiatives.

In addition, Bill Gibson, CIO at the Australian Taxation Office, said a major CRM project had to be moved to Melbourne because the agency was unable to hire the necessary 100 senior-level IT staffers in the capital city of Canberra.

There's an overall shortage of senior IT project managers within Australia, and the problem is especially acute at federal and state government agencies, said Phillip Tusing, an analyst at IT recruiting firm Greythorn Australia in Sydney.

GLOBAL FACT

IM

Number of people directly employed by India's IT and business process outsourcing industry.

SOURCE: NATIONAL ASSOCIATION OF SOFTWARE AND SERVICE COMPANIES, DELHI, INDIA

Tusing added that project managers with newer IT skills will be able to name their price for at least the next five to six months.

■ JULIAN BAJKOWSKI, COMPUTERWORLD TODAY (AUSTRALIA)

Group Wants to Create African Telecom Agency

LUSAKA, ZAMBIA

THE COMMONWEALTH Telecommunications Organisation, a London-based international development agency, last month called for the creation of a single authority to harmonize telecommunications regulations and licensing policies across Africa.

Ekwow Spio-Garbrah, the organization's CEO, said a continental regulatory body could advance the development of IT and communications in many African countries.

The proposal was debated last month at a conference in Ghana, where some delegates argued that it would be more realistic to foster regional agencies instead of creating one superagency.

Africa already has several regional telecommunications groups, including the Telecommunications Regulators Association of Southern Africa, the West African Telecommunications Regulators Association and the Forum on Telecommunication Regulation in Africa. ☎ 52917

■ MICHAEL MALAKATA, IDG NEWS SERVICE

Compiled by Mitch Betts.

Briefly Noted

Thierry Breton resigned as chairman and CEO of France Telecom SA late last month to become the French government's minister of finance. The company's board named Didier Lombard, who had been in charge of technology and partnerships, to replace Breton. France Telecom is the former monopoly telecommunications carrier in France and maintains a close relationship with the French government, which still holds 42.2% of the company's shares.

■ PETER SAYER, IDG NEWS SERVICE

Yamaha Motor Europe NV in Amsterdam is using software from SPSS Inc. in Chicago to analyze responses to customer surveys, SPSS announced last week. The vendor added that Yamaha plans to use the feedback to improve the designs of its motorcycles.

Financiera de Desarrollo Territorial, the Colombian government's finance agency, has implemented Web-based business process automation software from Verity Inc., the Sunnyvale, Calif.-based company said last week. The Bogota-based finance agency is using Verity LiquidOffice to process credit approvals for low-interest mortgages.

EDS Pushing Massive IT Retraining Effort

20,000 IT workers to get training in Java, .Net, J2EE

BY THOMAS HOFFMAN

Electronic Data Systems Corp. has embarked on a mammoth retraining program aimed at providing 20,000 of its 87,000 technical workers with updated business and technology skills by the end of this year.

The effort began about a year ago, when the Plano, Texas-based IT services giant began evaluating the skills of its 117,000 worldwide workers and consolidated multiple IT skills databases into a single SAP AG skills repository, said Dave Arcemont, vice presi-

dent of global learning and development.

The program is part of the EDS Multi-Year Plan, which Arcemont described as a "revolving footprint" of where the company is going over the next three years. "We worked very closely with the product managers in the portfolio group to see what skills were needed to support" customer demand, he said.

That analysis of customer project demand found that EDS needed to retrain a large number of its 87,000 technical workers with outdated skills so they could learn newer technologies such as .Net, Java and J2EE, said Arcemont. Last September, EDS launched a

retraining Web portal for those employees, encouraging them to take advantage of on-line and classroom courses being offered.

"We had learning advisers on a hotline to provide real-time coaching," said Arcemont.

Thus far, EDS has had 17,200 employees enter the retraining program.

EDS has set a target of having 20,000 technical workers enroll in one or more of the 718 training courses it has set up for 2005, said Arcemont.

Although he declined to quantify the investment that EDS is pouring into its retraining effort, Arcemont did say that the company has added \$35 million to its training

budget for this year.

Katherine Spencer Lee, executive director at Robert Half Technology, an IT staffing services firm in Menlo Park, Calif., said she is impressed with EDS's approach. "They're reaching out to companies like IBM, Dell and Fujitsu, and they were humble enough to say, 'We don't have all the knowledge, and who can help us with this?'"

Skill-building Hurdles

Most CIOs and IT organizations mistakenly look at retraining as a one-time event, said Mark Lutchen, a partner in the IT business risk management practice at PricewaterhouseCoopers in New York.

"They recognize a set of needed skills, they develop them, and then they forget

about them until they become obsolete," he said.

Another problem CIOs face, said Lutchen, is that when they present IT workers with opportunities to broaden their technical and business acumen, most technical workers don't want to bother to learn new skills. That's troublesome on several levels, he said, not the least of which is that it can lead to a disproportionate number of high-salaried, experienced IT workers with outdated skills.

Plus, technical workers who are willing to receive additional training "want to narrowly focus on the technical skills only, and that's not the right approach," said Lutchen. "People skills and communication skills are just as important as the technical skills." ☎ 52970

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Health Data Exchanges Get a Boost From IT

Hospitals, Chicago health agency plan rollouts for online information sharing

BY HEATHER HAVENSTEIN

TWO LARGE HEALTH care organizations are launching projects to build automated systems for exchanging data, a key step in the Bush administration's plan for developing a national health IT infrastructure.

New York-Presbyterian Healthcare System, a federation of hospitals and nursing homes that is the country's fourth-largest health care provider, this summer will begin work on a collaborative network that will let five of its acute-care hospitals share quality-of-care information with one another. Officials said they aren't sure when the network will be operational.

Meanwhile, the Chicago Department of Public Health is finalizing plans for a Java-based system designed to help it detect and respond to outbreaks of infectious diseases, including those caused by biological terrorism attacks.

The New York-Presbyterian network will build on a proof-of-concept project that New York-Presbyterian Hospital completed in December with IBM, two other hospitals in Indianapolis and Nashville, and several federal agencies. The pilot network was used to ag-

gregate data on infectious diseases from disparate systems for reporting to the agencies.

New York-Presbyterian plans to use software that IBM developed out of the pilot project, said J. David Liss, the health care system's vice president of government relations and strategic initiatives.

Integration Brokers

IBM began shipping the WebSphere Business Integration for Healthcare Collaborative Network technology last month. The software uses integration brokers to route data from "publishers," such as hospitals and medical clinics, to government agencies and other "subscribers." A gateway installed at participants' sites filters, links and maps data elements based on applied busi-

ness rules, according to Liss.

The New York-Presbyterian system, which includes 51 facilities in New York, New Jersey and Connecticut, received a \$1 million grant from the U.S. Department of Health and Human Services for the upcoming project. As part of the planned network, officials are "looking at how we can embed

quality assessment measures across numerous hospitals," Liss said.

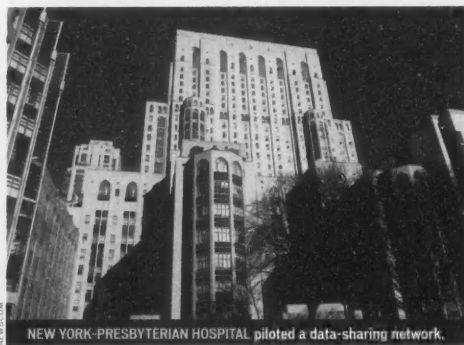
Chicago's Public Health Department, the second-largest local public health agency nationwide, has finished the design of its electronic disease-surveillance system, said Debbie Sills, a consultant at New York-based Deloitte & Touche USA LLP, which is helping to build the system. An initial implementation is due to be deployed in the fall.

The surveillance system will enable physicians to file

online reports about suspected cases of infectious diseases. It will integrate the filings with electronic lab reports and send them to public health investigators via e-mail. Information will be stored in an Oracle database, and Sills said the agency will be able to quickly change database tables as disease outbreaks occur.

Health care officials in Chicago want to reduce the time it takes to begin an investigation after doctors notice suspicious conditions in patients, Sills said. "Now it can take days, if not weeks, to get outbreaks contained," she noted. "That would be a disaster in a bioterrorism incident."

Deloitte is modeling Chicago's system on one it helped the Pennsylvania Department of Health build. That system was deployed in 2003. **52976**



NEW YORK-PRESBYTERIAN HOSPITAL piloted a data-sharing network.

MORE ON HEALTH CARE

In this **ISSUE**: Frank Hayes says medicine's biggest player has to push for adoption of electronic health records. **Page 62**

Online: Health care's resistance to **NEW IT** investments may be waning.

QuickLink 52899
www.computerworld.com

Continued from page 1

IT Operations

ternal IT service providers and reducing IT expenses by \$63 million between 2001 and 2004.

Still, Pelosi said that getting PSEG's 300-person IT organization to run smoothly as a business unit took a fair amount of time and effort. Technology workers need a high-level understanding of financial plans and concepts such as return on investment, Pelosi said at the IT Financial Management Week conference here last week. The event was organized by the New York-based International Quality & Productivity Center.

Other problems can crop up even after years of evolving an IT shared-services business. For instance, Carlson Companies Inc. has had an IT shared-services organization since the

late 1990s. Since 2001, the Minneapolis-based provider of travel and hospitality services has automated its chargeback system to the point where business-unit customers can view invoices online with a detailed summary of services and pricing, said Bev Swanson, director of business strategy at Carlson.

But there have been snags. For example, Swanson's group once charged business units for storage on a per-gigabyte basis on the 15th day of each month. Last year, it learned that some business managers were moving data from one set of disk drives to another on the 14th, resulting in zero-sum charges, she said. Then they would move the data back to the original disk drives on the 16th. A business executive acknowledged moving the data, but "we didn't go back and recharge them" for the storage fees, Swanson said. "It

was a relationship issue."

At Lehman Brothers Holdings Inc., depreciation on new and existing hardware purchases is automatically calculated and applied to customer invoices using software from San Francisco-based Business Engine Corp. The New York-based investment bank put the system into production earlier this year, according to Brian Greenberg, Lehman's vice president of IT.

Defining Use

Last year, KeySpan Corp. developed a 26-category IT services catalog. In November, the company began issuing an itemized monthly bill of IT services for business-unit customers, said Frank La Rocca, acting CIO at the Brooklyn, N.Y.-based electric and gas utility. "We met with [business] customers two months ago, and they struggled with defining what they use from

IT," he said. The itemized bill "helps articulate that."

Still, KeySpan has decided not to implement an automated chargeback system — at least for the time being. "Our CFO told us, 'Don't spend a quarter to chase a nickel,'" said La Rocca.

Some CIOs have had to make difficult choices in order to effectively run their IT shops. For example, The Williams Cos., a Tulsa, Okla.-based natural gas and electric power company, has whittled its IT organization from 1,000 people across four IT shops to just 100 people in a single department over the past few years — thanks, in part, to the outsourcing of some of its application support, said CIO Ron Mucci.

He added that the IT workers who remain with the unit "are expected to have as much business knowledge as business people." **52969**

Correction

A COLUMN ABOUT the Federal Communications Commission in last week's issue ("FCC: Mission Accomplished") opened with a quote taken from the agency's Web site that was erroneously characterized as Congress' original charge to the FCC in 1934. The quote details the FCC's current mission. The error was introduced during the editing of the column.

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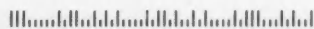
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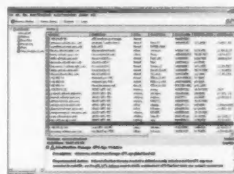
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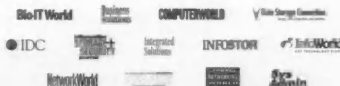
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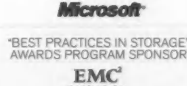
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i2 Appoints Head, Inspires User Hopes for a Rebound

Plan to boost supply chain software maker's consulting group gets approval

BY MARC L. SONGINI

USERS of i2 Technologies Inc.'s applications last week said they are hopeful that the installation of a new CEO portends a brighter future for the troubled maker of supply chain software.

The Dallas-based company last week appointed one of its directors, Michael McGrath, CEO and president, replacing co-founder Sanjiv Sidhu (see Q&A with McGrath this page).

An i2 spokeswoman said McGrath, co-founder and retired CEO of Waltham, Mass.-based consulting firm Pittiglio Rabin Todd & McGrath Inc., was chosen from among several candidates. The company stated that McGrath's position is temporary. Eventually he will replace Sidhu as chairman, and a new CEO will take McGrath's slot.

Experience May Help

McGrath's background as a third-party integrator should help in i2's effort to broadly expand its consulting operation, said Ravi Vancheeswaran, director of planning for the integrated products group at ON Semiconductor Corp. in Phoenix. The company runs i2 Demand Planner, Supply Chain Planner and Factory Planner, among other applications.

McGrath's plan to expand i2's consulting services is also good news for ON. Vancheeswaran said, noting that "i2 has good supply chain management tools and supplier management tools, and this will bring a focus on how to extract their value for customers."

While i2 has provided ON with adequate technical consulting services to help in its

effort to create a supply chain management infrastructure, the vendor needs more business-process-focused consulting to help users further exploit the software, Vancheeswaran said.

"The next question we need to ask is, 'Where should I be holding inventory, and how can I best leverage the tools to give us the biggest bang for the buck while keeping inventory levels down and on-time delivery up?'" he said.

Another i2 user, Richard

Scheerer, CIO at The Clarks Companies, North America, also said he is encouraged by McGrath's appointment and plans for the vendor. "i2 continues to be an important component in Clark Companies' application portfolio," he said in an e-mail.

"It appears that i2 has weathered the troubled times, and any effort to grow the company and make it a bigger player in the supply chain space is good for the current user base," Scheerer said.

The Newton, Mass.-based maker of shoes uses i2's Demand Planner, Supply Chain Planner and Demand Fulfill-

New i2 CEO to Resize, Refocus Troubled Firm

McGrath will refocus offerings, cut up to 400 jobs

BY MARC L. SONGINI

After a seven-month search, ailing supply chain software manufacturer i2 Technologies Inc. named board member Michael McGrath president and CEO. He replaces i2 co-founder Sanjiv Sidhu, who will remain there as chairman.

McGrath, a member of the i2 board of directors since August, is a co-founder and former chairman and CEO of high-tech consulting firm Pittiglio Rabin Todd & McGrath Inc. He retired from that post last July.

i2's financial position has been shaky for some time. In an interview with Computerworld last week, McGrath said that he plans to keep the Dallas-based company independent. He also explained that i2's 2,000-person workforce will have to be cut by up to 20%.

What makes you qualified to run i2? I joined the board this summer after following i2 for many years. I've been in the software industry since its beginnings and created and ran one of the major consulting firms in the world.

Can you give your plans for i2?

I can't give you specifics, as I've had the job for less than 24 hours. We have to regain the respect of our investors and show them i2 is, in fact, a profitable business.

We need to get the resizing of the company to happen. One has to expect layoffs, and we've told people internally that's a part of cost reduction.

The second objective is to provide a strong foundation for the company. For example, we need to improve the way we deliver consulting services to be more efficient.

McGrath's interim role is not purely [to be] a temporary shepherd, but [it's] more of a rescue mission to right a ship he will remain with.

KEVIN O'MARAH, ANALYST, AMR RESEARCH INC.

ment applications to support manufacturing and customer service processes.

While it's unlikely that any-

Third, we need to refocus our strategy to make sure we have solutions to deliver big results to clients.

How radical will the changes be?

Pretty radical. I'm somebody who likes to move quickly and make dramatic changes and get big results.

The first milestone will be in 30 to 40 days, and we'd like to give the demonstration we can be profitable and show the changes I'm talking about.

i2 has the potential to be a profitable company. Our commitment to our customers is to give them solutions, and these require not just applications but appropriate middleware and application integration.

It includes best practices and process changes. It means making our consulting services more robust and working with consulting partners.

What is your specific technology vision?

It's a little premature for me to say. The big thing is that we're dedicated to big results for our customers, and

one can rapidly restore i2 to full financial health, McGrath has a special advantage in that he is both an outsider to i2 and has some intimacy with its situation from his role on the board of directors, said Kevin O'Marah, an analyst at AMR Research Inc. in Boston.

"His interim role is not purely [to be] a temporary shepherd, but [it's] more of a rescue mission to right a ship he will remain with," O'Marah noted.

Last year, i2 lost \$1.4 million as revenue slumped by more than \$100 million to \$389 million. If i2 can stop hemorrhaging cash and change its focus to generate business results, its technological excellence could give it the ability to drum up meaningful new business, O'Marah said. "People tend to underestimate how strong the product set is and how satisfied early customers were," he said. **52920**

that's going to be the theme behind all our software and services.

We're not going to be happy just selling something and not getting results for customers. We have to have the courage and maybe even sell them less.

In recent years, i2 has been through a lot, including the stock exchange delisting and a U.S. Securities and Exchange Commission investigation. Is that going to be a problem for you to overcome? It's potentially an obstacle. It's something we're hoping we can put behind us. We've got a fresh start here, and we're building something new at i2.

Can you give an update on your efforts to get relisted? We're continuing to do that. We had a stock split. We [next] need to work with Sanjiv to bring on a couple of independent directors. It's important a company like ours be listed on Nasdaq.

We have to instill confidence in the customer who makes a major investment in us and needs to know we're going to be around. **52922**



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IBM, Lenovo Executives Outline Plans

BY ROBERT McMILLAN
LAS VEGAS

Yang Yuanqing, president and CEO of Lenovo Group Ltd., and

Stephen Ward, general manager of IBM's Personal Systems Group, face an interesting few months. The executives must

manage the creation of what Ward calls the "first-ever Chinese company to become multinational" while looking to pla-

cate U.S. government fears about the selling of advanced technology to a Chinese company. If Lenovo's \$1.75 billion acquisition of IBM's PC business is completed, Ward will become

Q&A

CEO and Yang chairman. Ward and Yang spoke to the IDG News Service last week during IBM's Partnering conference.

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What is the No. 1 issue for you right now? Are you focused on logistical issues, strategy issues or political issues? Ward: The first things we've spent time on are our customers, our partners and our employees. The second is the development of the strategy going forward. The third is culture. Yang: We have to close this deal and separate the PC business from IBM.

What is the biggest problem that you're facing? Ward: The biggest problem that we're facing, by far, is communications. We're communicating like crazy. I have literally met with 100 CEOs on this topic. And I could spend all my time just meeting with customers, as could Yuanqing.

How many employees are going to be moving and where? Yang: We don't have a big plan to move too many people from China to the U.S. or from the U.S. to China. Ward: Our strategy right now says research and development should be done where smart people are. Sales has to be done where you can talk to business partners. Over time, you have to constantly look for how you can do things much more efficiently.

Lenovo has tried and failed to expand into new areas before. What makes you think you will be more successful this time? Yang: I think the new company should focus on the desktop, but we can try new things in the Chinese market. If we can be successful in other areas, we can take them worldwide.

So will we be seeing Lenovo-branded printers and mobile phones in the U.S.? Ward: You will see Lenovo-branded products in the United States. We haven't decided which ones, but you will definitely see Lenovo-branded PCs and laptops, as well as IBM ThinkPad-branded products. **52924**

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DON TENNANT

Here to Stay

NEARLY A DECADE AGO, just a few months after Microsoft shipped Windows 95, I asked Bill Gates if it was a conscious decision in the development of that product to give Windows

more of a Mac look and feel. Of course I knew he'd say it wasn't, but I couldn't resist asking.

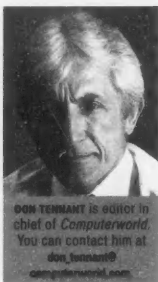
"There was no goal even to compete with Macintosh," Gates proclaimed. "We don't even think of Macintosh as a competitor."

That was a crock, so I pressed the issue a little. I asked him how he accounted for the widespread perception that Windows 95 looked a lot like Mac 88, and whether the similarity was just a coincidence. I didn't expect a sobbing confession of mimicry, but I thought it would be cool to see how he'd respond. Surprisingly enough, Gates shifted gears and became more forthcoming.

"Some of the things in Windows 95 the Mac had earlier," he acknowledged, citing long file names, plug-and-play capabilities and built-in peer-to-peer networking. You know that had to be tough for him, so when he proclaimed that "there's a ton of things even in Windows 3.1 that the Mac doesn't have, that someday they'll probably add to their system, too," I didn't have the heart to call him on it when he didn't cite any examples.

That exchange with Gates came to mind after I read the "Giants in Jeopardy" story on page 32, part of our special report on the future of IT. I found it striking that the IT visionaries who foresee a decline in Microsoft's dominance due to threats like Linux and Google never mentioned Apple Computer.

Long before Linux became a thorn in Microsoft's side, Apple was a full-



DON TENNANT is chief of Computerworld. You can contact him at don_tennant@computerworld.com.

fledged pain in the company's you-know-what. On the one hand, it was in Microsoft's best interest for the Mac to be successful, since software for the Mac has long been a huge business for Microsoft. That, in fact, is why Microsoft invested \$150 million in Apple two years after the launch of Windows 95.

On the other hand, Microsoft had to deal with the abhorrence of being perceived as a technology follower, playing catch-up to the operating-system strides that Apple was making. That the best technology doesn't always win is a truth of life to which Microsoft owes much of its success, and Apple's technology never really bruised much more than the egos of Microsoft's executives. Still, it's interesting that Apple has become so completely marginalized in some quarters that it's no

longer even part of the discussion of a future world order in which Microsoft is seen as less dominant.

I'm no IT futurist, but trust me, you need to include Apple in the discussion. If you don't believe it, I urge you to read Mark Hall's story in last week's issue "In Business to Stay" [QuickLink 52603]. It's a compelling account of how a growing number of your peers are using Apple's technology in corporate environments outside of traditional Mac strongholds like publishing. One of the key attractions, Hall notes, is that the Mac OS X operating system, with the exception of its user-interface and management tools code, is an open-source version of Unix that's tuned for open-source offerings like the Apache Web server, MySQL database and JBoss application server.

Combine that open-source carrot with near-bulletproof security, and you begin to understand that we're talking about more than being late to the game with long file names here. The best technology may not always win. But it's not going to go away, either. **52930**

Don Tennant



DAN GILLMOR

Getting Back The HP Way

LIKE MANY people who remember Hewlett-Packard in its glory days, I offered a quiet cheer when the company's board of directors showed Carly Fiorina the door early last month. It was an overdue recognition that her tenure as CEO, while not entirely a disaster, was essentially a failure.

Her departure brought to mind a scenario that was proposed during the long battle over whether to buy Compaq, which pitted Fiorina against the son of one of the founders. I can't remember where I heard (or possibly read) the suggestion, but it went along the following lines:

1. HP goes ahead and buys Compaq.

2. HP then sells its printer business to Agilent Technologies Inc. A spin-off from the old HP, Agilent focuses on the test and measurement businesses that once were core to HP's operations.

3. HP keeps the computer business and renames itself Compaq.

4. Agilent, which has now reassembled the businesses that made up the heart and soul of the old HP, renames itself Hewlett-Packard.

The scenario made sense in a wickedly ironic sort of way, though it was obviously not in the cards at the time. It makes even more sense now, because HP is plainly flailing around for a strategy.

I can even suggest a CEO for the newly revived Compaq: its former CEO Michael Capellas. He's been running telecommunications firm MCI, which is selling itself to one of the big regional phone monopolies. So he'll be looking for something to do. No doubt he's also a candidate for the top HP job. But whether anyone can manage the



DAN GILLMOR, a writer based in Silicon Valley, is the author of *We the Media: Grassroots Journalism for the People* (O'Reilly Media Inc., 2004). Contact him at grassroots@gillmor.com.



high availability: the IT imperative

Enhancing HP ProLiant servers with innovative technologies

Organizations are under growing pressure to support non-stop business operations without increasing the IT budget. Given their position at the center of the IT infrastructure, servers play a critical role in determining both the overall availability as well as the total cost of ownership of that infrastructure.

To ensure high availability, a server must proactively respond to failures, both within the server and the network to which it is attached. High availability requires that a system administrator manage a server without having to be colocated with that server, and that the server remain available while a failed component is repaired.

Intel[®] PRO
Network Connections

INSIDE

Redundant Ethernet Connections	2a
Intel [®] Xeon [™] Processors	2a
Network Adapter Teaming	2a
ProLiant Essentials	
Intelligent Networking Pack	2a
Integrated Lights-Out Technology	3a
Advanced Memory Protection	3a
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many factors combine

to influence server availability. HP and Intel are developing sophisticated technologies like redundant Ethernet connections and network adapter teaming that enhance server availability and enable IT organizations to satisfy today's business requirements.

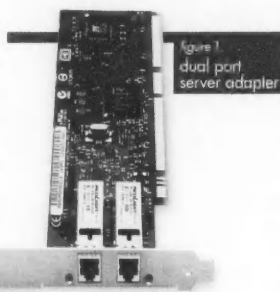
redundant Ethernet connections

Server adapters act as an interface between the server and the network. Therefore, they play a critical role in determining server availability and performance.

Some server adapter features are based on industry standards. These include flow control (IEEE 802.3x*), VLAN tagging (IEEE 802.1Q*) and link aggregation (IEEE 802.3ad*). Other influences are vendor specific, such as the amount of onboard memory and the operating systems supported.

To address slot-constrained environments, server adapters offer multiple ports. Multiple port server adapters allow IT organizations to meet current demands like segmenting the LAN to reduce network bottlenecks. In addition, multiple port server adapters enable fault tolerance to maintain server availability by rerouting traffic to another port if a problem develops on the network.

Multiple port server adapters enable IT organizations to respond to industry trends, such as server consolidation and virtualization, that are driving the need for more network ports. These are also required to accommodate virtual servers while supporting segmentation and fault tolerance.



ProLiant servers support multiple port server adapters. The HP NC6170 and NC7170 Gigabit Ethernet server adapters with Intel technology offer 128 KB of onboard memory, which leads to enhanced performance. Flexibility is increased because these adapters support copper and fiber optic interfaces, as well as Ethernet, Fast Ethernet and Gigabit Ethernet connections. The HP NC6170 and NC7170 improve

scalability by doubling the number of ports that a given server can support.

HP network adapter teaming

HP's network adapter teaming consists of two to eight NIC ports that function as if they were a single NIC. When configured for network fault tolerance (NFT) teaming, traffic within a team is automatically shifted from a failed port to a working port without disruption of service. The network remains available while the failed network device is replaced.

Transmit load balancing (TLB) enables the sharing of the server's outbound network traffic among the members of a team. TLB enhances availability because it can be split across multiple network switches to provide switch redundancy.

When configured for switch-assisted load balancing (SLB) teaming, all inbound and outbound traffic is shared across all the members of the team. And the same traffic is shared among the ports on the switch used by the port teams.

ProLiant Essentials Intelligent Networking Pack

The ProLiant Essentials Intelligent Networking Pack (INP) enables ProLiant servers to adapt and change the network path to help ensure maximum availability. INP resides at server nodes and is aware of

64-bit Intel® Xeon® processors: high availability building blocks

today's business requirements demand IT organizations deploy servers that are designed to be powerful, reliable and highly available. Leading technologies like redundant Ethernet connections, network adapter teaming, memory management and Smart Array controllers enable improved flexibility and broad software compatibility. These innovations offer IT professionals the tools to effectively address high-availability platform challenges, both now and in the future.

high availability, power savings and higher performance.

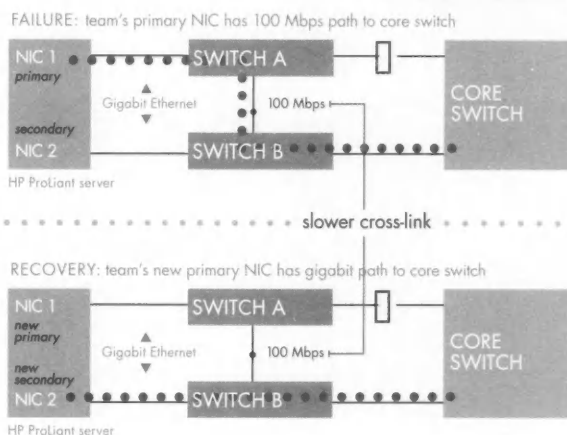
64-bit Intel® Xeon® processor-based platforms are highly available because they incorporate technologies such as redundant DIMMs (dual inline memory modules), memory

scrubbing and RAID controllers on the motherboard. Enhanced Intel SpeedStep® technology and DDR2-400 memory support help reduce power and cooling costs by using advanced power-management techniques. Server performance is improved by technologies such as Intel® EM64T, Enhanced Intel SpeedStep technology, Hyper-Threading Technology, PCI Express® and Intel NetBurst® microarchitecture.

With a history of technology innovation and a broad base of hardware, software and integration leaders, Intel consistently delivers enterprise-class performance, quality and availability. This approach helps you to build for the future with confidence on a platform that evolves as your business grows.



Figure 2. Fast path failover



the network infrastructure from the first tier of switches and beyond. As network conditions change, the INP monitors and analyzes the network conditions, and redirects traffic to the optimum path.

INP offers three key features: *active path failover*, *fast path failover* and *dual channel teaming*. Active path failover allows a ProLiant server to maintain connectivity with the core network even if the link between the intermediate switch and the core network has failed. When active path failover is configured, the ports in a team continually monitor for connectivity to the core network. The primary path automatically fails over to the secondary path as soon as it senses a loss of connectivity.

Fast path failover determines the fastest path to the core switch to help maximize network performance and availability by identifying network path degradation. For example, fast path failover would detect if the Gigabit Ethernet connection from an access switch to a core switch fails and the traffic is rerouted over a 100-Mbps Ethernet connection. It would then fail the traffic over to an alternative Gigabit Ethernet connection.

Dual channel teaming allows system administrators to create a team of NICs that support, receive and transmit load balancing, and provides switch redundancy. This combination of capabilities is not available

with any other team types such as SLB or TLB. With dual channel teaming, two NIC teams appear as a single connection to the server. If one of the switches fails, there is no loss of connectivity and the failed switch can be replaced without affecting server traffic.

virtual presence

HP's *Integrated Lights-out (iLO)* technology reduces cost and increases server availability by giving an IT organization a virtual presence within the data center as well as on any remote system. That means no matter where the server is located, the IT organization has control over the key system resources such as the console, keyboard, mouse and power. Using iLO, an IT organization even has the ability to make storage media appear local to the server. In addition, iLO continues to operate even if the server's operating system is not functioning.

IT organizations can use iLO to install, configure, monitor, update and troubleshoot remote ProLiant servers from a standard web browser, command line or script without requiring any additional software on the client system. iLO is integrated with other management tools, making it easier to combine virtual presence capabilities with other server lifecycle management tasks from deployment to ongoing administration.

memory protection technologies

ProLiant servers use a variety of techniques to protect against errors, and hence increase availability. For example, HP was one of the first companies to introduce advanced memory protection technology such as *ECC (Error-Correcting Code) memory*, *online spare memory*, *mirrored memory* and *RAID memory* in industry-standard servers.

To improve memory protection even further, HP introduced *Advanced ECC technology*. Advanced ECC technology is capable of correcting a multi-bit error that occurs within one dynamic random access memory (DRAM) chip.

The ProLiant server online spare memory determines if an active DIMM (dual inline memory module) exceeds a predefined error threshold. The error will be corrected and the data from the entire bank that contains the failed DIMM will be copied to online spare memory. The failed bank is deactivated, but the server will remain available until the failed DIMM is replaced during a scheduled shutdown.

Whereas online spare memory mode protects against single-bit errors and entire DRAM failure, mirrored memory mode enables full protection against single-bit and multi-bit errors. In mirrored memory mode, the same data is written to both system memory and mirrored memory banks, but data is read only from the system memory banks. If a DIMM in the system memory banks experiences a multi-bit error or reaches the pre-defined error threshold for single-bit errors, the roles of the system and mirrored memory banks are reversed.

HP is one of the first companies to support *hot plug RAID memory*, which allows the memory subsystem to operate continuously even in the event of a complete memory device failure. In this context, RAID stands for *Redundant Array of Industry-standard DIMMs*.

Hot plug RAID memory generates parity for an entire cache line of data during write operations and records the parity information on a dedicated parity cartridge. However, hot plug RAID memory does not have the mechanical delays of seek time, rotational latency and bottlenecks associated with disk drive arrays.

cooling & power

There are two types of cooling redundancies. One allows users to run their server until they shut it down and replace the failed fan. The other maximizes server availability by permitting the failed fan to be changed while the system is still functioning.

HP performs hundreds of system tests on each of its ProLiant servers. During these tests, the fans are independently stress tested. For greater reliability, only fans with ball bearings are used. HP servers include counter-rotating fans with fixed stators, designed to produce greater airflow at higher flow impedances and a more uniformly directionalized airflow.

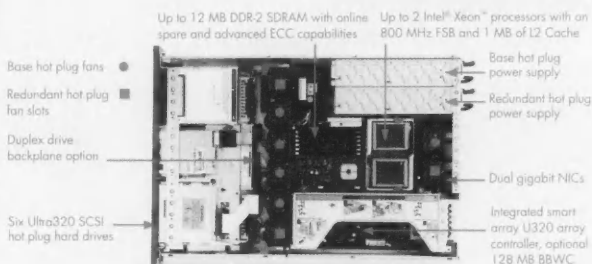
ProLiant servers allow the addition of a *redundant power supply*, or removal of an existing redundant power supply for servicing at any time without interrupting server operation. Having a redundant power supply protects the server against the failure of a power supply, as well as the failure of the AC line cord. When a server is equipped with two power supplies, each provides approximately half of the power required by the system. This helps to reduce component stress, which enhances overall reliability.

Smart Array controllers

In this context, RAID refers to *Redundant Array of Independent Disks*. RAID technology allows a group of disk drives to be tied together to function as a single logical disk drive, providing increased performance and availability.

HP's *Smart Array controllers* are integrated on ProLiant servers, and support a variety of RAID types including *RAID 1+0* and *RAID 5*. Developed and patented by HP, *RAID Advanced Data Guarding (ADG)* is further supported on Smart Array controllers. This technology creates two sets of parity striped data across the disks to help ensure the system can withstand multiple disk failures without data loss. RAID ADG enables high levels of fault tolerance in a cost-effective manner.

Figure 3. HP ProLiant DL380 G4 server



A RAID array controller will store data temporarily in cache memory during data transfers. If a power interruption occurs after data has been written to cache memory and before it is written to a disk, the cached data will be lost. To avoid this problem, HP's Smart Array controllers

should look for features like redundant server adapters, and advanced network adapter teaming capabilities such as fast path failover.

Highly available servers also require functionality such as HP's industry leading memory protection and Smart Array

Figure 4. RAID selection guide

MOST IMPORTANT	SECONDARY IMPORTANCE	RAID LEVEL CHOICE
Cost Effectiveness (cost per usable capacity)	fault tolerance ► performance ►	RAID ADG RAID 5 (RAID 0 if fault tolerance is not needed)
Fault Tolerance	cost effectiveness ► performance ►	RAID ADG RAID 1+0
Performance	cost effectiveness ► fault tolerance ►	RAID 5 (RAID 0 if fault tolerance is not needed) RAID 1+0

support *redundant battery-backed cache*, providing battery backup for up to four days. Once the power has been restored, the data in the cache is then moved to a disk.

making the right choices

Companies of all sizes and industry types are increasingly adopting a non-stop approach to business operations. To support this approach, IT organizations must continually improve component availability.

HP ProLiant servers are the cornerstone of a reliable IT infrastructure. When selecting a server, IT organizations

should look for features like redundant server adapters, and advanced network adapter teaming capabilities such as fast path failover. Highly available servers also require functionality such as HP's industry leading memory protection and Smart Array

HP (NASDAQ "HPQ") is a technology solutions provider to consumers, businesses and institutions globally. The company's offerings span IT infrastructure, global services, business and home computing, and imaging and printing.

Intel (NASDAQ "INTC"), the world's largest chip maker, is also a leading manufacturer of computer, networking and communications products.

For more information on ProLiant servers and increasing server availability, visit www.hp.com/go/proliantavailability or call 1-866-625-4090

lumbering giant is an open question.

In fact, the future of the company began fading years ago, when the founders and their immediate successors left the scene. HP began losing its way when it began shedding the HP Way.

The HP Way has been ridiculed in recent years, but it meant something important. It came from the commitment of the founders, who knew that the core of their company was a purpose, something more holistic than Wall Street's simple and craven hungers. They believed, more than most tycoons, that a company exists not just for its shareholders, but also for its employees and the communities in which the company does business. There was a humanistic bent to their approach.

HP people were part of a corporate culture that frequently made them proud. It also made them loyal. Silicon Valley communities, and other places where the company had facilities, felt the benefits.

Under Fiorina, the HP Way was viewed as a vestige of a more naive time, an outmoded and even counterproductive way of doing business. And as the company shed its more humane ways, its employees and communities felt that process too.

HP didn't dump everything of value. And the company still has thousands of people who try every day to do their best, for their colleagues and for their neighbors. But the culture that meant so much for so long has faded. That has been a great loss.

One school of modern thought holds that we live in a time when humanistic concerns are irrelevant to corporate life or are even a detriment to success. The HP that embraced more positive values has changed. But that HP is also missed. **52860**

BRUCE A. STEWART High-hanging Fruits Worth The Risk

IF THERE'S A common thread running through IT leadership today, it's the

avoidance of risk. This attitude just reinforces Nicholas Carr's argument in his book *Does IT Matter?* that all of information technology is a commodity. Where organizations make a difference, though, is at the margins, where risks are higher but so are rewards. We've picked the low-hanging fruit. Who will climb the ladder to go after the ripe opportunities at the top?

Four years into the budget belt-tightening, you feel pretty good about yourself. You've managed to trim the fat and get projects under control. Your clients are generally happy. You're being asked to get involved in redesigning parts of the business like end-to-end processes and call centers.

Meanwhile, some of your peers are putting themselves on the CEO fast track. The game is afoot: Careers are being made in 2005. But much will depend on whether you reach for the higher-hanging fruit.

Last year, Meta Group conducted two multiclient studies, one on CIOs as corporate change agents and one on the perception of value from IT investments. In both studies, CEOs repeatedly came forward banging the innovation drum. They were generally frustrated by the response



BRUCE STEWART, a former CEO, is author vice president and director of executive services at Meta Group Inc.

is in short supply. It doesn't matter how much data you have — or how easy it is to get to — if the information needed to seize opportunities isn't present when you need it. If the claim that we don't have information boggles your mind, ask yourself how easy it is to determine whether a customer is truly profitable and influential or whether a supplier has untapped capabilities that are worth getting access to without forcing it to cut another penny on unit costs. These are just two ways to say who matters in a business and service sense.

Innovation through information is good, but the road ahead has a few bumps in it. 2005 is a year of getting ready — we see steps being taken to prepare for future risks and move speedily in 2006.

First of all, savvy CIOs are making sure their IT organizations have the required skills, mind-sets and leader-

ship traits to handle and manage riskier ventures in-house. Consultants and packages won't create a high-reward future.

Second, they are honing their organizational skills in envisioning the future, from developing scenarios around common requirements visioning to looking for ways to experiment cheaply and productively.

There's a reason the CIOs' business peers haven't responded innovatively themselves, and the fast-track CIOs are closing the gap to create joint successes.

Lastly, they're learning through the process redesign and reinvention assignments they've been given where the business could be improved, but they're working to shed their process myopia. New business lines are formed, after all, from useful functions, not a focus on process, and they need to tighten their fit to the market.

Are you able to step up and deliver growth? Cost management won't go away — process redesign (the mark of mature businesses) will remain important. But even one or two high fruits, selected for potential payoff, will make the difference when the CEOs of 2010 are picked! **52735**

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WANT OUR OPINION?

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READERS' LETTERS

Fill That Jump Bag

TWO MORE THINGS to put in a "jump bag" for an emergency response to a network attack: a camera, and tape or sticky labels for sealing evidence ("Fill Your Jump Bag," QuickLink 51714).

Gary Hinson
CEO, IsecT Ltd., London

Counseling Carly

I'VE NOW SEEN two articles in *Computerworld* attributing the ouster of Carly Fiorina from Hewlett-Packard to her inability — or unwillingness — to set HP on a course to follow IBM's model. Who said she should? This sounds like orthodoxy to me. I have no opinion

on Fiorina one way or another, but blaming her for not following an existing model sounds to me a perfect example of an all-too-common business strategy — following a model that grew out of an older, different set of conditions rather than deriving a new plan based on the current environment.

Daniel R. Flasar
Informatics core manager,
Washington University,
St. Louis, drflsrs@aol.com

Managing Mergers

WITH REGARD to the article "Mechanics of a Merger" (QuickLink 52257), one thing really irks me. That is CIO Tyler Best's action of arbitrarily firing the entire IT

departments of both companies that merged to form ANC Rental Corp. It seems that rather than take the time to determine which individuals were responsible for the ineffectiveness, he felt it was easier to blame everyone. I am sure he callously caused undue hardship to many talented and previously faithful employees. It is a sad statement on how management thinks.

Melvin Davidson
Unemployed, Selden, N.Y.,
melvin695@earthlink.net

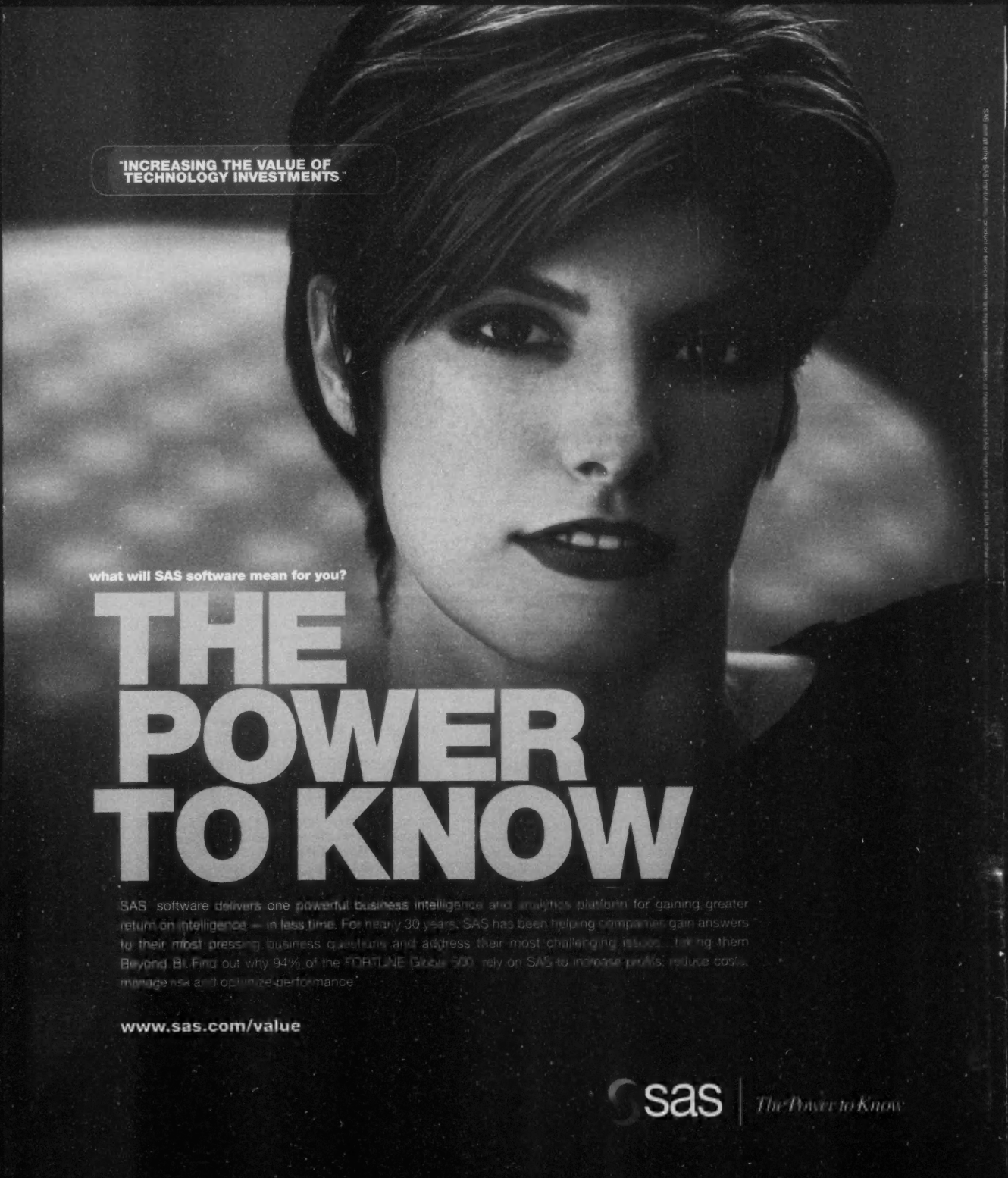
I LOVE THIS STORY. Clean house, fire employees, reduce expenses, make the stock go up. This is the management of today! I guarantee that if either Alamo or National isn't the cheapest rental car company

in the world, it will never get my business.

Harry Bunting
Hardware/software engineer,
Palo Alto, Calif.,
HarryB2378@aol.com

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The Power to Know

THE FUTURE OF IT

03.07.05

Reaching Out

Outsourcing, open-source and the commoditization of information technology are all trends that will push IT outside the boundaries of the organization. **Page 28**



The Vendor Scene: Giants in Jeopardy

Smaller, more agile vendors pose a threat to the dominance of the larger players, but don't expect a rapid revolution, say our panelists. **Page 32**



The Dark Side

All will not be rosy in the future of IT. Our panelists see no quick end to the plagues of shoddy software, security breaches and unmanageably complex systems. **Page 36**

INTRODUCTION

What does the future hold for IT? We thought the best way to answer that question was to ask the experts, so we sought out the views of a baker's dozen of IT visionaries that includes university professors, CIOs, IT consultants and a software vendor researcher.

We did not ask our panel about technology per se — when we will see quantum computing, what the future of microprocessor architectures is and so on. Rather, we sought their views on the economics and delivery of IT. What's the future of open-source software, utility computing, application services and software license practices? What will happen in outsourcing and offshoring, and how will the IT that stays in-house change? How will the vendor landscape evolve? And what does it all mean for the IT manager?

We also asked our panelists what worries them (answer: a lot) and what advice they'd give IT managers to help them navigate the coming decade. Advice ran the gamut from how much to budget for research to how to beat the competition. One panelist outlined six software development best practices, while another gave reasons why you should cut out the cost-cutting mind-set and bone up on anthropology and sociology.

IT consultant Paul A. Strassmann compared today's IT shops to "medieval guilds" for their do-it-all mentalities, but all of our prognosticators said that will change dramatically in the years ahead. And, although CIO André V. Mendes said the CIO will disappear as a separate breed of manager, no one said IT would stop being important.

Harvard Business School professor F. Warren McFarlan put it this way: "An article appeared a year and a half ago in the *Harvard Business Review* — 'IT Doesn't Matter.' But IT is going to be much more important, much deeper, much more powerful over the next 20 years. The notion that this is becoming a commodity, back-office utility couldn't be further from the truth." **52738** — Gary H. Anthes

THE FUTURE ONLINE

CONNECTED CONVERSATIONS AND SWARM INTELLIGENCE. The Santa Fe Institute's W. Brian Arthur describes a future full of sensors that talk to one another, and self-learning systems: **QuickLink 52695**

INSIDE MOVES. As companies get more technology from external sources, internal IT shops will change, along with the role of the managers who run them: **QuickLink 52745**

WHAT TO DO? Our panel's advice, among other things, is to forget about cost-cutting and start thinking about sociology and anthropology: **QuickLink 52864**



THE View[s] Ahead

**SPECIAL
REPORT**

A panel of **IT visionaries** and **provocateurs** polish up their **crystal balls** and look to the future.

Reaching Out

As their **options multiply**, companies will increasingly look **beyond the boundaries** of their own organizations to procure IT. **By Gary H. Anthes**



MIKE WALLACE

A NUMBER OF EXISTING trends will accelerate and converge to fundamentally change the way companies procure IT, in essence pushing much of IT out the door. The Computerworld panelists say open-source software will proliferate — but not everywhere — and applications will increasingly be purchased as services from external parties, allowing some companies to scrap their data centers entirely. Offshoring of IT will

PANELISTS

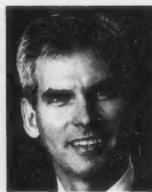
Our panel comprises a diverse group of academics, researchers, analysts and CIOs. What they have in common is a long history of observing IT trends and making connections to the industry's future.



■ **W. Brian Arthur**, economist, Santa Fe Institute. He has written extensively about the evolution of economies, including that of the high-tech era.



■ **Gordon Bell**, senior researcher, Microsoft Research. He was formerly vice president of engineering at Digital Equipment Corp.



■ **Frank Gens**, senior vice president for research, IDC, Framingham, Mass. He's the author of IDC's "Executive Insights," a monthly executive brief on the state and future of the IT industry.



■ **Michael H. Hugos**, CIO, Network Services Co., Mount Prospect, Ill. He has more than 20 years of experience in corporate IT and is a Computerworld columnist.



■ **Thomas Malone**, professor of management, MIT Sloan School of Management, Cambridge, Mass. He was a co-founder of the MIT initiative "Inventing the Organizations of the 21st Century."



■ **Thornton May**, futurist and dean, IT Leadership Academy, the University of Florida, Jacksonville. He has written about the future of IT for numerous publications and is a regular Computerworld columnist.

increase, but changing labor and productivity rates will swing the pendulum back in favor of in-house systems development for some companies.

Riding the Open-Source Wave

Open-source software will become pervasive for core computing and business applications — everything from basic operating and telecommunications systems to accounting, inventory, contact management and personal productivity applications, predicts Network Services Co. CIO Michael H. Hugos. "The spread of Linux and open-source software is ending the need to standardize on any one vendor's software," he says.

Like other developments predicted by our panelists, this one will be influenced by forces abroad. "In Asia, you are going to see a great deal more [open-source] encouraged by the Chinese because they don't want their army or their government held hostage to Microsoft," says Harvard Business School professor F. Warren McFarlan.

Christopher Meyer, chief executive of Monitor Networks, agrees that open-source will continue to grow in importance and says that China will be a major reason. "Established software vendors will be unable to make their pricing policies stick there," he says.

Commodity IT

"Freeware" will drive prices down, says Don Tapscott, president of New Paradigm Learning Corp. "Now that Wal-Mart is selling a stripped PC for \$300 — that you can load with Linux, Firefox and OpenOffice — it will accelerate the use of open-source software."

But will those Wal-Mart boxes find

The Pricing Problem

A central issue in the discussion of utility computing is how to charge for it. Sun Microsystems Inc.'s pricing model — a single price per head for a known chunk of functionality — will dominate for a while, according to IT futurist Thornton May.

"That's the interim step, where you basically say, 'We are going to codify the 40 things that happen in IT and give you Six Sigma levels of security, precision and reliability and deliver those for a given price,'" he says.

But, May predicts, **pricing for utility computing will evolve into pricing for utility business functions.** Buyers

won't contract for a piece of software, as most have done, or for IT services like disk storage or transaction processing, as some are starting to do. Rather, they'll be looking for business results, he says.

"An example would be customer retention," May says. "All the things that go into customer retention would be Lego-like business process blocks. You start with the business metric and parse that into the technology components that impact that."

"A major success driver for the IT community will be the ability to translate from technology to business and from business to technology," May says.

— Gary H. Anthes

their way into businesses? "The average North American corporate desktop doesn't seem ready for a Linux-based PC yet, mostly because MS Office has such a huge installed base and because minute but annoying incompatibilities between OpenOffice and other MS versions will not make these savings worthwhile," Tapscott says. "But I think the invasion of low-cost PCs is inevitable." One impediment to desktop Linux adoption will be corporate lawyers worried about the legality of the software, he adds.

Some clever hybrid approaches may become popular, some say. As open-source becomes prevalent, current licensing terms may give way to a digital rights management approach that keeps some rights reserved, like that supported by the nonprofit copyright group Creative Commons, Meyer says.

"That approach would, like iTunes, institutionalize, standardize and legitimize sharing of software and ensure appropriate control and rewards for producers," he says.

Thomas Malone, a professor at MIT's Sloan School of Management, says software development efforts will likely gain some — but not all — of the characteristics of open-source. "For instance, Asynchrony Software pioneered a model where self-organizing teams of programmers from all over the Net develop software products together," he says. "But they don't do it for free; they each get a share of any eventual royalties from the sale of the products."

Not So Fast . . .

Other panelists are decidedly less enthusiastic about open-source software, at least in some applications. "You can-

not assure high levels of reliability from systems built exclusively by volunteers," says Paul A. Strassmann, the former top IT manager at the Pentagon. "I admire open-source software as a means for innovation, but not for delivering the infrastructure for an information-based civilization."

The quality of open-source software varies, and open-source is often little more than a backlash against Microsoft, says Microsoft researcher Gordon Bell. "Many things in the world that are 'free' come at substantial cost — 'free' like a puppy."

Bell warns that "open-source" has a number of meanings, depending on the goals of the providers and users. "For example, Linux started out as something that meant free, but now suppliers are focusing on some advantage and uniqueness for each marketplace," he says. "It remains to be seen whether Linux will fragment in the same way that Unix dialects formed, which prevented the formation of a healthy independent software vendor industry."

IT: Buy It by the Yard

Utility computing — in which users buy IT resources such as storage, compute cycles or application services as though they were electricity — is nothing less than "the future of computing," Strassmann says. "The idea that each organization must invest in its own infrastructure, custom applications, unique data definitions, and location-specific software and hardware is economically not sustainable. Only medieval guilds are comparable to the structure of existing IT organizations."

David Moschella, global research director at CSC Research and Advisory



■ **F. Warren McFarlan**, Baker Foundation professor, Harvard Business School. He has been instrumental in incorporating the study of information systems into the business curriculum.



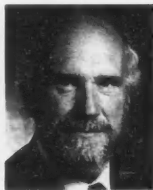
■ **André V. Mendes**, vice president and chief technology integration officer, Public Broadcasting Service, Washington. He has training in the biological sciences and says principles of biology can be applied to IT.



■ **Christopher Meyer**, chief executive, Monitor Networks, a Monitor Group company, Cambridge, Mass. He's co-author of *It's Alive: The Coming Convergence of Information, Biology, and Business*.



■ **David Moschella**, global research director, CSC Research and Advisory Services, a Computer Sciences Corp. company. He's also an author and a regular *Computerworld* columnist.



■ **Howard A. Rubin**, senior vice president, Meta Group Inc.; professor emeritus of computer science, City University of New York. He's the author of "WorldWide IT Trends and Benchmark Report."



■ **Paul A. Strassmann**, researcher and author. He has served as CIO at several Fortune 100 companies and federal agencies, and he wrote *Information Productivity* and *The Squandered Computer*.



■ **Don Tapscott**, president, New Paradigm Learning Corp., Toronto. He's co-author of *The Naked Corporation: How the Age of Transparency Will Revolutionize Business*.

Staying In-house

RULES FOR SMART COMPANIES

As IT labor rates rise overseas and fall or remain constant in the U.S., the financial advantage of offshoring will shrink and more software development will be done in-house, predicts Network Services CIO Michael H. Hugos. And smart companies will adopt development practices that increase their productivity and make in-house alternatives still more attractive, he adds. Hugos says **six core techniques**—he calls them the “**skills of the game**”—are crucial for successful in-house development shops:

- 1 Joint application design for pooling the collective knowledge and ideas of business and technical people.
- 2 Process mapping for drawing out existing workflows and designing new ones.
- 3 Data modeling for defining the kinds and volumes of data that a system will handle.
- 4 System prototyping for modeling a system's user interface and its technical architecture to verify that it will work as expected.
- 5 Object-oriented design and programming for creating systems from predefined and reusable software components.
- 6 System testing and preparation for testing, debugging and fine-tuning a system and training the people who'll work with it.

Hugos isn't reticent when it comes to making claims about the benefits of the practices he has defined. “A miracle of increased productivity and customer satisfaction will occur when disciplined groups of developers take these skills to heart and apply them consistently and rigorously,” he says.

—Gary H. Anthes

Services, says the utility model is already here. “It's what most consumers and small businesses already do as they use and sometimes even pay for Web-based or mobile services,” he says.

Large businesses will follow suit, he says. “Too many IT organizations are currently drowning in low-value IT work,” Moschella says. “Only by using more-standardized, [utility-style] services can companies redeploy their resources to focus on things that can deliver unique business value.”

And running computers isn't one of those things, McFarlan says. “Data centers a decade from now will be gone. You'll be using a combination of application service providers and third parties for security and backup and so forth,” he says. China will be an important player, McFarlan predicts. And, he says, an entire industry will spring up that's focused on very high reliability, redundancy and security.

André Mendes, vice president and chief technology integration officer at Public Broadcasting Service, says that standardizing things such as wiring, network protocols, desktop hardware and operating systems, e-mail clients, server hardware and databases has boosted efficiency in his IT shop a great deal over the past five years.

“The next steps involve the outsourcing of all of these services to companies whose core competencies focus on the 99.999% availability that I need, but at a much lower cost,” he says.

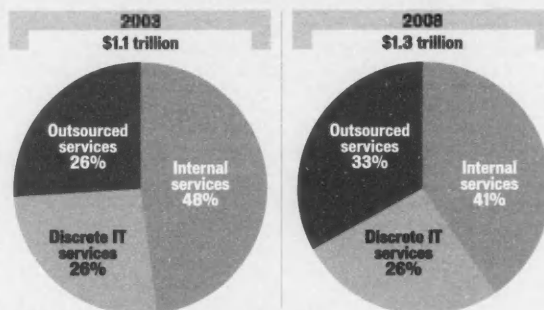
“The first part that's easy to do is storage, then computing cycles,” says Mendes. “And once that's done on a subscription basis, then there's standardization at the application level.”

Will Mendes eventually close his data center? “Absolutely. I think that's actually necessary,” he says. “There will be companies that specialize in ultra-high security and reliability. It's going to be more and more expensive to have that in-house, and with that expense comes additional liability. At what point do you outsource that liability to someone who does it for a living?”

Users will benefit from utility computing's simplified pricing, Hugos says, and that will bring with it less-onerous

GROWTH GOES TO OUTSOURCING

Outsourcing will capture most of future increases in global IT services spending.



Projected compound annual growth rate, 2003-2008:

Internal services: 0.4% Discrete IT services: 3.9% Outsourced total: 7.9% IT services total: 6%

SOURCE: BARTNER INC., STAMFORD, CONN.

licensing terms. “Licensing will become simple annual payments based on the number of users or transaction volumes that a company has. Enforcement will be largely voluntary because the annual payments will be low and the software vendors will have easy ways to audit a company and find out if they are in compliance or not.”

Utility computing will gain ground first inside companies as a way to make more efficient use of their own resources, Tapscott says. “Then, once they have their internal utility architecture, it only makes sense that they can plug into outside utility computing resources when they need it,” he adds.

But Meyer says he doubts that it will become commonplace for companies to buy raw processing power like they buy electricity. “The communications and coordination costs will swamp the hardware costs,” he says. “But there will be applications in very computing-intensive applications, like meteorology and animation, in which cycle-grabbing will be an attractive solution.”

Meanwhile, Offshore . . .

Procuring IT from abroad will become so common, panelists say, that a broad array of IT services will be available

around the world, almost like a futures market where labor is readily bought and sold, or “arbitrated,” on the basis of small differences in price and quality.

“The software industry will become completely global,” Meyer says. “Sourcing of talent will become efficient enough that deviations of price from value will be arbitrated. Today, superior software people move to where they can get paid what they are worth, but tomorrow they won't have to.”

Competitive pressures will force companies to turn to global labor markets, McFarlan agrees. “Fiber optics basically allows us to arbitrage labor markets that used to be distinct from each other but are now absolutely connected,” he says.

Offshoring has so far been driven mostly by efforts to lower costs and make them more manageable, says Moschella. “But increasingly, customers are looking to their outsourcing partners to help them in areas such as innovation, agility, value and even transformation,” he says. “The focus of the outsourcing industry over the next five years will be on improving their ability to be true business partners with impact far beyond cost control.”

And that shift will have a profound effect on outsourcing practices, says Sloan's Malone. “Eventually, all the opportunities to gain from shifting work to low-wage countries will have disappeared because the low-wage countries won't be so low-wage anymore,” he says. “When that happens . . . different companies, and countries, will become experts in providing different kinds of services and products.”

52743

THE BOOM IN ENTERPRISE LINUX

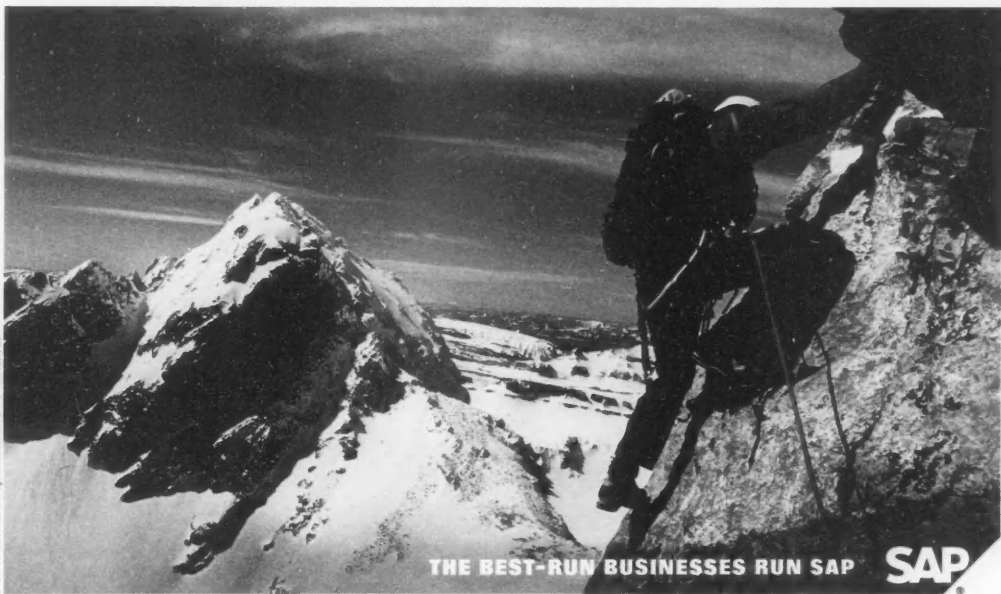
Projected worldwide Linux operating environment new license and upgrade/maintenance revenue, 2001-2008

	2001	2002	2003	2004	2005	2006	2007	2008
Revenue (\$M)	\$82.5	\$89.3	\$129.7	\$183.8	\$248	\$319.9	\$402.2	\$492.8
Growth (%)	NA	8.2%	45.3%	41.7%	34.9%	29%	25.8%	22.5%

SOURCE: IDC, NOVEMBER 2004

Compound annual growth rate, 2001-2008: 30.8%

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THE VENDOR SCENE:

Giants in Jeopardy

It would be **foolhardy** to underestimate the **staying power** of companies like Microsoft, but **smaller, more agile players** pose a serious threat. **By Gary H. Anthes**

MICROSOFT'S GLORY DAYS are, if not behind it, at least numbered, according to most of the *Computerworld* panelists. And that probably goes for the other goliaths of IT as well. But even though our seers predict a less-prominent position for the industry big guys, don't expect more agile players to whittle them down to size very quickly, say our panelists.

"Microsoft has already defied the odds once by staying a dominant player as the computer industry made a major technological transition in the late 1990s from the PC era to the Internet era," says Thomas Malone, a professor at MIT's Sloan School of Management. "It's not impossible for Microsoft to do this again, with whatever the next major technology turns out to be, but I'd have to say the odds are against it."

But panelists don't agree on just what Microsoft's biggest challenge is. For IT consultant Paul A. Strassmann, the company's business model just isn't suited to the 21st century. "Microsoft enjoys astronomical profit margins selling software wherein the customer ends up spending a large multiple of the purchase price and incurs all of the risks," he says. "Google, because of their architecture, can introduce innovations much faster than Microsoft, which is now hobbled with a huge accumulation of hard-to-upgrade code."

IT futurist Thornton May agrees, saying the Microsoft economic model is outdated. "Microsoft is running out of rich, dumb customers," he says. "If you are technologically smart, you can replicate 80% of the functionality of Microsoft Office essentially for free."

The company has two

monkeys on its back, says Don Tapscott, an author and president of New Paradigm Learning Corp. The first is the high expectations of shareholders. "A company of Microsoft's size has to continue to dominate new multibillion-dollar markets just to meet these expectations, so just finding new areas for growth will be a major challenge," he says. "The second challenge comes from networked/pervasive computing. The desktop and operating system are no longer the center of the electronic universe."

And David Moschella, research director for CSC, sees Microsoft enemies everywhere. "The combination of open-source software, ASP services such as Google, an increasingly hardware- and operating-system-neutral Internet and the emerging global economy all work against Microsoft's once overwhelming dominance," he says. "Linux has effectively ended the threat of a server monopoly, and Microsoft's share in new consumer device- and Internet-based services markets is not strong. And emerging economies such as China and India are not inclined to make themselves part of the Microsoft empire."

Microsoft's strength has been a good thing until now because it established de facto standards, just like the IBM PC before it, says Michael H. Hugos, CIO at Network Services Co. "But like IBM, Microsoft will gradually see its market share eaten away by less-expensive, less-complicated, more-responsive alternatives that use the Microsoft standards in areas like the user interface, program APIs and so on."

Having fended off government attempts to break it up, Microsoft now ought to break itself up voluntarily, says Hugos. "The present Microsoft culture is unable to move beyond the mindset that they acquired during their heyday in the 1990s. If it remains in its present mind-set, Microsoft will wind up on the defensive everywhere, as in, 'Windows is cheaper to run than Linux,' 'We can do search too just like Google,' 'We can make PDAs and iPods just as well as the next guy,' and so on."

Microsoft's enormous momentum can still carry it far, Moschella says. "Don't feel too sorry for Microsoft; its position in its core markets and vast cash resources should guarantee healthy financial results for many years to come," he says.

And, IDC analyst Frank Gens points out, "a lot of people have lost a lot of money shorting Microsoft over the past 20 years. They are almost religiously bound to a single-stack philosophy and product line. That has limited their degrees of freedom, by their own choice. But [Microsoft is] also one of the smartest companies out there."

When the time is right for Microsoft to move to a new business model, it will do it, Gens predicts.

Elsewhere on the Vendor Front . . .

Microsoft isn't the only giant surrounded by threatening Lilliputians, the panelists say. "There already is a mature market of '90s-style ERP systems dominated by companies like SAP, Oracle and a few others," Hugos says. "But . . . those companies are not serving growth markets. The growth markets belong to those furry little mammals that are scurrying around eating the dinosaurs' eggs while the dinosaurs are out fighting with each other."

Continued on page 34





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Continued from page 32

André V. Mendes says he's not ready to write off the big vendors. "These people are very, very bright, and they understand the endemic nature of change," says Mendes, a vice president at Public Broadcasting Service. "They have the ability, by virtue of their cash flow, to fund R&D that allows them to stay on top."

The IT vendors that prosper in coming years will be those that can keep moving into noncommodity markets, says Mendes. "Commoditization of IT will move higher and higher up the hardware/software/application stack, forcing companies like Microsoft to focus higher and higher on the stack as well," he says.

That move up the stack will be good for users, says Gens. "Both enterprise customers and vendors are realizing that if everything is presented as just a bunch of piece parts, and we depend on the integrators to make sense of it and turn it into business value, it just slows things down. So we'll raise the level of where we are integrating above the low-level, arcane technologies to some good, stable, high-performance platforms. Vendors will create a much wider variety of deep, verticalized applications." Standard development platforms like .Net, J2EE and Web services will make it affordable for vendors to do that. "All the underpinnings that an application developer would

A View From Inside Microsoft

Gordon Bell, senior researcher at Microsoft, isn't flustered by fellow panelists' predictions that his company is headed for decline. Microsoft benefits from competition from upstarts like Google, because, as it has demonstrated in the past, it "seems to be able to consider every company a competitive threat or opportunity to work with," he says. "I believe this makes it a great company. It shows no signs of lethargy or complacency."

Similarly, Bell says he's not worried about threats from open-source software. "Both commercial software and [open-source software] offer specific advantages, and several development models will coexist in healthy competition. Microsoft has used the Shared Source Initiative to get the best of both commercial and open-source models."

Moreover, Bell says, the initial cost savings from "free" software can easily be offset by higher maintenance costs. "About the worst

thing that could happen to an IT organization is to have to maintain very much open software. [You] can outsource this to someone else, but that just moves the work from one budget to another."

And Microsoft's dominance is good for users, Bell says. "Microsoft pioneered the high-volume software model based on serving tens of millions of users. High volume is the key to cost and reliability."

Bell acknowledges that Microsoft can improve in areas such as security, which its Trustworthy Computing initiative addresses. "A whole division of research is working on tools, just transferred to product development, to address the problem," he says. "Their tools automatically check code for common errors by searching for classes of bugs that can lead to security vulnerabilities, program crashes and hangs."

— Gary H. Anthes

have to create themselves, they can just assume it's there," Gens says. "So customers will see a packaged application market, but it will be a much richer one."

Moschella sees an even more profound change in the vendor landscape. "As IT spreads into ever-more-specific business products and services, it will become

increasingly difficult to say who is an IT vendor and who isn't," he says. "Consider Wal-Mart in RFID, Starbucks in wireless, Amazon in Web services. One can argue that the number of IT companies will actually start to expand rapidly, since these days, almost every company is an IT company to some extent." **■ 52764**

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THE Dark Side

The future may hold **bad software, ever-more-dangerous security threats** and a host of other causes for concern, say our panelists.
By Gary H. Anthes

OUR PANEL finds plenty to worry about, from the sometimes deplorable quality of commercial software to cybercrimes and an erosion of U.S. leadership in IT. Leading the list of concerns — perhaps because it's so troublesome today — is the software quality issue, with its evil triad of poor security, unreliability and complexity.

Easy, trouble-free use of IT has moved to the top of users' wish lists, some say. "It's not much use making the digital technology better, cheaper, faster; that's going to happen in any case," says economist W. Brian Arthur. "Computers are working about as fast as we need. The bottleneck is making it all usable."

Panel members rounded up the usual suspects. "The purveyors of this complex and unreliable software are the current big software

vendors," says Network Services Co. CIO Michael H. Hugos. "We all deal with some of them on a daily basis, and everyone knows who they are, including the vendors themselves."

But a day of reckoning is coming for these vendors, Hugos and others predict. "There is a great pent-up demand for alternatives, and now, thanks to open-source software and commodity IT platforms, there are beginning to be industrial-strength alternatives to the products of the big software vendors," Hugos says.

Not surprisingly, Microsoft researcher Gordon Bell refuses to take the vendor-bashing lying down. Says Bell, "We are trying to address the product part of security and unreliability through the Trustworthy Computing initiative that Bill [Gates] launched almost five years ago. So far, it has impacted virtually every part of the company, ranging from the way it develops software to the product itself."

So, What Will Users Do?

Users historically have not insisted on performance guarantees and warranties from vendors, but the evil triad will propel them to do just that, some predict. "With enormous competitive pressures on profits, the smart customers will take their business to where they can get performance warranties and operating simplicity," says IT consultant Paul A. Strassmann.

Meta Group analyst Howard A. Rubin says that application service providers and other third parties will be better able to deal with issues of security and reliability because of their economies of scale, and they will be forced into offering guarantees. "Customers will start to measure software quality and the costs of poor quality and will write penalties into contracts," he says. "Product liability will start to have real legal teeth."

Meanwhile, end users will take matters into their own hands, says David Moschella, research director for CSC. Companies' employees are growing increasingly sophisticated in their use of IT, and they will no longer always look to corporate IT for help, he says. "Instead, they will look to the Internet and wireless worlds and will find an abundance of inexpensive and easy-to-use services. Over time, many of these offerings will be competitive and even superior to the offerings of corporate IT." **52766**

More to Fret About

Just as the future is rich in the variety of opportunities it affords, the anxieties of our panel members took many forms.

■ "Issues of information security, cyberterrorism and the loss of U.S. technology leadership to rapidly emerging competitors." — *Paul A. Strassmann*

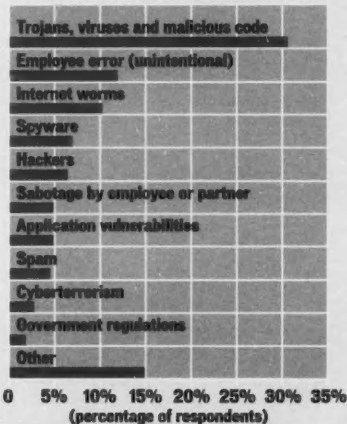
■ "That IT will be dominated by a few large vendors, such as Microsoft, SAP and Oracle, and innovation and creativity will be stifled." — *Michael H. Hugos*

■ "That CXOs, still cynical and cautious from the post-dot-com, tech depression, bear market, global recession, post-9/11 and Enron business environment, will continue to be dazed and confused about the role of IT in competitive advantage. This environment creates a strategic danger for every company. IT is not decreasing in importance; it's growing as the corporation goes through the biggest changes in a century." — *Don Tapscott, president, New Paradigm Learning Corp.*

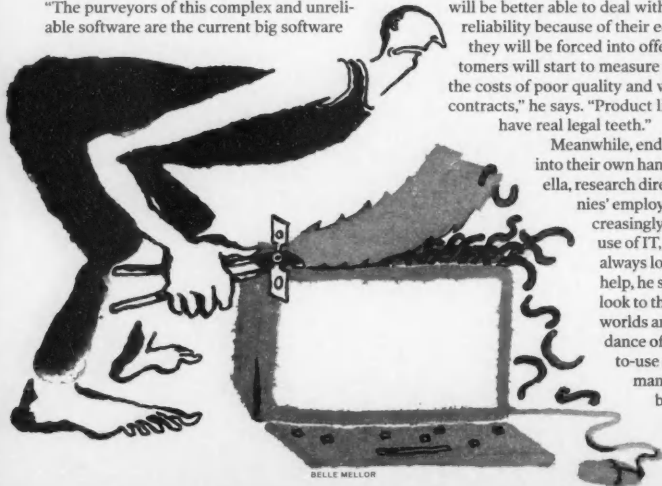
■ "About the U.S. being able to produce enough scientists and engineers to compete effectively. Also, I'm worried about 1) Internet meltdown that causes serious economic disruption and causes people to distrust IT and go back to 'safe' methods, 2) a serious attack on cyberinfrastructure (not just hoods and punks — real war), and 3) an erosion of intellectual property rights in Europe and Asia that kills the software industry." — *Gordon Bell*

Threats to Information Security

What is the single greatest threat to your company's enterprise network security?



Base: 606 respondents
SOURCE: IDC, "WORLDWIDE IT SECURITY SOFTWARE, HARDWARE, AND SERVICES 2004-2008 FORECAST," 2004



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TECHNOLOGY

03.07.05

TOGETHER ON SCREEN

Many organizations are discovering that composite interfaces can be a good option when full-blown EAI isn't needed.

BY SUE HILDRETH

THE UNITED WAY of Metropolitan Atlanta recently faced an integration problem that's all too familiar to IT managers. The charity, which provides a variety of services to over 4 million children and adults, needed to provide fund-raising campaign workers with a uniform view of the information it had on its donors and aid recipients. Unfortunately, that information was scattered across three applications.

"Our campaign people would have to look into several different databases and have two or three different windows open, trying to match the various fields of information they needed to get a 360-degree view of our donors and volunteers," explains CIO Elaine Mitchell Norman.

But while the organization's experience is fairly common, the method it chose to solve it isn't. Instead of coding or purchasing a new application or attempting to use an enterprise application integration (EAI) or data integration system on the back end, the United Way opted for a front-end approach.


First, it replaced its contact management software with a sales force automation system from application service provider Salesforce.com Inc. Then it used Above All Studio, an integration tool from Above All Software Inc. in San Mateo, Calif., to link information and functions from other applications into an overlay interface for Salesforce.com. Above All's graphical user interface, which enables semitechnical users to map functions, was a boon to United Way, says Mitchell Norman.

"We don't have huge staffs of programmers or huge budgets for contractors," she says. "The graphical [interface of Studio] allows you to see data relationships, so someone with SQL experience can make relationships between the data in the systems." Now, campaign workers access all the data they need from one screen. "They log into Salesforce, and the data they need is there," says Mitchell Norman.

As the United Way scenario illustrates, a top-down approach to integration can offer significant benefits in situations when full-blown EAI is unnecessary.

"It's appropriate if you're trying to replicate a manual process where you need to hop among a dozen different applications to complete a task," says Teresa Jones, an analyst at Butler Group in Hull, England. "Rather than go into one application, write down a number, then key that into a second application, you can integrate that into one screen that looks like a single application but with the underlying applications still there."

That's different, she notes, than simple data integration in which databases share data. User interface integration im-



Thanks to the use of a composite interface, fund-raising workers at the United Way of Metropolitan Atlanta can get all the data they need on one screen, says CIO ELAINE MITCHELL NORMAN.

AND STATES

plies integration of functionality as well as data. Such integration can be achieved with a variety of technologies, including the following:

- A services assembly and orchestration product like Above All Studio.

- An interface-reuse technology, such as a programmatic interface server like Jacada Ltd.'s Fusion, which developers can use to create an interface that can input or retrieve data from underlying applications, or Corizon's User Process Management software, which assembles new interfaces from bits of existing ones.

- Rich-client technology, such as products from Nexaweb Technologies Inc., JackBe Corp. or Macromedia Inc.

- Interactive portlets in a portal, like IBM's WebSphere Portal or Plumtree Software Inc.'s portal product.

The Portlet Approach

Unico Service Co., a \$700 million outsourcing that provides facilities services for office buildings, universities and sports arenas, chose to use interactive portlets running on WebSphere Portal to create applications on top of existing systems. The portlets can query databases, input data and access application functions. They can also be joined into miniapplications, with one portlet passing data and events to another.

Unico used some off-the-shelf portlets from IBM and built others with Bowstreet Inc.'s Portlet Factory to create a quality-inspection interface for handheld devices, according to Bill Jenkins, senior IT director at Newton, Mass.-based Unico. Now service personnel in the field can use their handhelds to input inspection information. That data then gets synced with a

back-end J.D. Edwards & Co. system. Unico has also built a time-entry application at the portal to replace faxed paperwork and is working on an accounts-payable document interface to let employees view scanned invoices and paperwork along with other customer-account information.

Another advantage of portlets is that they can be reused. "We created a portlet that queries a database and returns a list. The next time we need a list query, it's already done," says Jenkins.

Integration through portlets also helps with security and deployment. "In the past, when we built everything, we'd have to worry about security, how we're going to deliver it to the desktop and how to integrate it with other applications," says Jenkins.

Screen Reuse

Programmatic interface servers feature screen-reuse technology that's essentially a more sophisticated version of screen scraping. That's the technology behind a major integration effort at the Washington-based U.S. Naval Facilities Engineering Command (NavFac), which manages the construction of shore facilities worldwide for the U.S. Navy. NavFac opted for screen integration when it sought to unify its procurement and contracting process.

Using Jacada's Fusion, NavFac built an interface of macros that invoke screen sequences off of its two primary contract-related systems: the Windows-based Standard Procurement System (SPS) and the mainframe Facility Information System (FIS), which handles funds management and project accounting. These screen sequences are synchronized by a newly developed composite application

INTERFACE-LEVEL INTEGRATION TYPES

According to Gartner analyst Daryl Plummer, there are four types of interface-level integration:

1 Composite views, in which information is extracted from different applications and presented in a unified screen.

2 Composite processes, in which a new multistep process that spans several applications is created.

3 Tasking and events, in which the integration disperses information—like a data input—across multiple applications, triggering other events.

4 Composite services, which is similar to a composite process but uses Web services.

called eContracts. The resulting unified interface enables procurement specialists to see the complete history and status of a contract.

"We had a lot of inefficiencies: redundant entry, lack of end-to-end visibility, fumbles where we'd hand something off through e-mail but the person would be out of the office," explains Cmdr. Scott Smith, assistant CIO of enterprise integration for NavFac. "With 60,000 actions per year and \$6 billion being handled by 2,000 different people, we simply couldn't continue to manage this in a haphazard way."

The other alternatives were a new ERP system or an integration broker, expensive options compared with the \$600,000 spent on the composite application and the FIS/SPS interface, says Smith. "We were looking at upwards of \$3 million dollars to do broker-based implementation, and the technical risk was high. The ERP approach would have required us to replace FIS and could easily cost upwards of \$100 million," he says.

Rich Clients

The University of Pennsylvania's Wharton School took a third approach to interface-level integration, basing its projects on rich-client technology. Rich clients make use of the local resources on the client, and data and application services from remote servers.

Wharton used Macromedia's Flash and Flex technologies to create a rich-client Web application that enables professors to create pictorial class layouts, says Dan Alig, senior IT project leader at Wharton.

The rich-client application imports a blueprint of the classroom from a Wharton server, along with student photos from the identity card database and class lists from the registration system. Professors drag and drop stu-

dent pictures into an assigned seating arrangement, which helps them to learn faces and names more quickly.

The system uses Flex's presentation-layer technology on Macromedia's ColdFusion application server, which handles the calls to the databases. Everything is rendered on the client via the Flash plug-in. The same technology will be used to update the school's class registration system, in which MBA students "bid" on elective courses. That interface will incorporate data such as registration information, the database where each student's available bidding "points" are stored and course descriptions and reviews.

"We've made the push to take business processes and data and make them available through a Web browser," says Alig. "These run via the Flash player, which all users have."

While rich-client technologies aren't normally thought of as integration tools, they are useful for bringing data and services together at the desktop and for giving users more power to modify the applications.

"With a rich-client application, a sales guy can decide to link a client record with another piece of information and link that to an application that's docked on my desktop, and suddenly they all work together," says Ron Schmelzer, a senior analyst at Zap-Think LLC in Waltham, Mass.

New Options

Making customization, and even integration, possible for less-technical users is appealing to cost-conscious businesses wary of major software projects. "The No. 1 issue for business customers is that it takes too long and too many IT resources to change applications when a process changes," says Erin Kinikin, an analyst at Forrester Research Inc. "Composites surface that business process so it's easier for a less-technical user to add a step."

Interface-level integration can produce tangible results faster than can a full-blown, months-long EAI or application development effort.

"Building new systems and integrating things on the back end takes effort, skills, money and time," says Daryl Plummer, an analyst at Gartner Inc. "You could do server-side integration. But to achieve something quickly—between two weeks and three months—you have to do something like this."

☛ 52736

Hildreth is a freelance writer in Waltham, Mass. She can be reached at Sue.Hildreth@comcast.net.

A SINGLE VIEW OF YOUR DATA

ENTERPRISE INFORMATION INTEGRATION (EII) is another recent approach to front-end integration. EII provides an integrated view of multiple data sources. Unlike EAI, it doesn't move data. Instead, EII puts an abstract layer over the data sources so users and applications think they're dealing with a single data source.

Gary Lien, systems architect at health club chain Life Time Fitness Inc., used Composite Software Inc.'s Composite Information Server to create a single interface to unite his point-of-sale system, his member management system and a database archive of historical customer data. A

browser provides one view of the data, so employees don't need to fetch information from each system. The browser sends the query to the Composite Information Server, which collects the information from the various databases and presents it to the user.

Lien prefers EII to back-end data integration or replication. "It's a high-maintenance task to keep everything replicated and synchronized," he says. The simplicity of the tool is also an advantage, says Lien. "When you're writing a query, it looks like a single database with views, and you just combine the views you want."

—Sue Hildreth

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Wavelets

DEFINITION

Wavelets are mathematical functions that let us divide data into different frequency components and then study each component with a resolution appropriate for its overall scale. Wavelets are used in computer imaging, animation, noise reduction and data compression.

BY RUSSELL KAY

IN MANY FIELDS of study, from science and engineering to economics and psychology, we need to analyze data so that we can discover underlying patterns and information. A common way of doing this is to transform the data by applying mathematical functions.

One of the best-known processing techniques is Fourier analysis, in which you can approximate a real-world data stream by adding together a series of sine and cosine curves at different frequencies; the more curves you include in your approximation, the more closely you can replicate the original data. Since we know how to work with these well-defined trigonometric curves, we can often deduce patterns in the data that would otherwise remain hidden.

But Fourier analysis has limitations. It works best when the original data has features that repeat periodically, and it has trouble with transient signals or data that shows abrupt changes, such as the spoken word. Often, we need to be able to change our analytical representation depending on the actual data, so that we can resolve more detail in specific parts of the data stream. In essence, we need a way to

change scale at various points, and scale is at the heart of wavelets.

The Notion of Scale

The following explanation is adapted from Dana Mackenzie's highly recommended article "Wavelets: Seeing the Forest and the Trees" (www.beyonddiscovery.org/content/view.txt.asp?a=1952).

Consider how we view a landscape. If you're looking down from a jet airliner in summer, a forest appears as a solid canopy of green. If you're in a car driving by, however, you see individual trees. If you stop and move closer, you can make out individual branches and leaves. Up close, you may spot a dewdrop or an insect sitting on a leaf. With a magnifying glass, you can see structural details of the leaf and its veins.

As we get ever closer to an

object, our view becomes narrower and we see finer and finer detail. In other words, as our scope becomes smaller, our resolution becomes greater.

Our eyes and mind adapt quickly to these changes in perspective, moving from the macro scale to the micro. Unfortunately, we can't apply this technique to a photograph or computerized digital image.

If you enlarged a picture of a forest (as if you were trying to get "closer" to a tree), all you'd see is a fuzzier image; you still wouldn't be able to make out the branch, the leaf or the dewdrop. Regardless of what you might see in the movies, no amount of "sharpening" or processing can help you see detail that hasn't already been encoded into the image. We can't see anything smaller than a pixel, and the camera can show us only one resolution at a time.

Wavelet algorithms allow us

to record or process different areas of a scene at different levels of detail (resolution) and using greater amounts of compression (scale). In essence, they let us take new photos at closer range. If you look at a collection of data (also called a signal) from a broad perspective, you'll notice large-scale features; using a smaller, closer perspective, you can observe much smaller features.

Enter Wavelets

Unlike the sinusoidal, endlessly repeating waves used in Fourier analysis, wavelets are often irregular and asymmetric, with values that die out to zero as they move farther from a central point. By decomposing a data stream into wavelets, it's often possible to preserve and even enhance specific local features of the signal and information about its timing.

Wavelets can take almost any shape, and much of the work being done in wavelet applications is based on finding appropriate wavelet functions that work for the type of data being processed.

The first wavelet function was a simple square waveform, developed by mathematician Alfred Harr in the early 1900s. Real advancement in the field, however, began in the mid-1980s, when Jean Morlet, an engineer at a French oil company, developed wavelet-transform analysis to interpret seismic data. He then teamed with physicist Alex Grossmann to formalize the mathematics.

Moving well beyond their geophysical roots, wavelets today are used for a variety of

purposes, especially in the areas of digital imaging and compression.

Depending on your needs, for example, you can use different types of compression [QuickLink a5480] to reduce the size of a digital image according to how much detail or accuracy you are willing to give up. Wavelet-based compression can be much more efficient than older types. Wavelets also make possible incredibly fine detail and texture mapping, such as the lifelike rendering of hair in the animated film *Monsters, Inc.*, while still keeping file sizes and processing times manageable.

Wavelets are central to a number of image-related compression standards, including the JPEG-2000 standard for color images and WSQ, the wavelet-scalar quantization gray-scale fingerprint image compression algorithm that the FBI has used since 1993 for storing its fingerprint database.

The wavelet compression in the MPEG-4 digital video standard offers better-quality Web-based video than JPEG, yet it produces files that are a fraction of the size. MPEG-4 also has several quality layers, allowing servers to adjust their output dynamically according to needed bandwidth.

Wavelets are also being used for noise reduction and image-searching techniques. Scientists are now exploring the use of wavelets for various types of medical diagnostics and for weather forecasting as well. **Q 52844**

Kay is a Computerworld contributing writer in Worcester, Mass. Contact him at russkay@charter.net.

ADDITIONAL RESOURCES

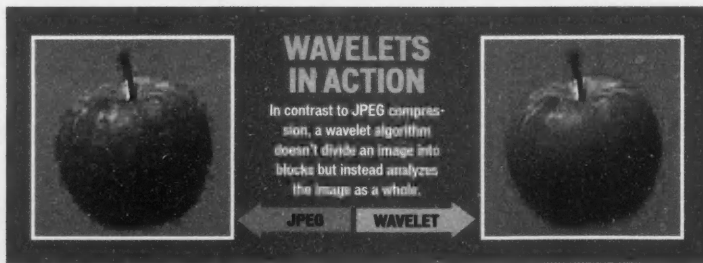
For links to more information and tutorials on wavelets, visit our Web site:

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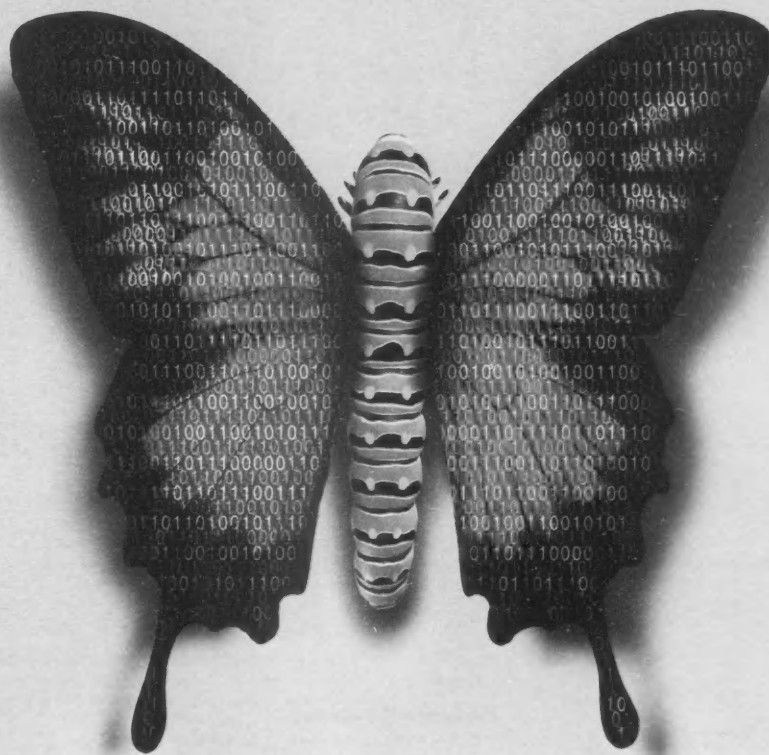
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Finding My Way in The Bureaucracy

Our security manager pushes on with contingency planning, but a visit with the CISO ends with a political faux pas. By C.J. Kelly

AFTER THE ADVENTURE that I described in my Feb. 14 column, "Disaster Recovery Planned on the Fly" [QuickLink 52227], I set about creating a real contingency plan. I've made some progress, but along the way, I've gotten a good taste of what it's like to work in a state agency.

Having found no evidence of contingency plans for either facilities or personnel, I decided that my first step should be to talk to the chairman of the safety committee. This fellow is a lifelong government employee who looks as if he should already be retired.

We've all heard the rumors that government employees, feeling secure with a lifetime job that provides good retirement and health benefits, have the mentality that "it all pays the same" whether they work hard or not. I now think those rumors are true. And I hear that it can take up to three years to fire someone around here. No wonder no contingency plans are in place.

I explained to the safety committee chairman that I was working on a contingency plan for the agency and that I wanted to make sure it addressed facilities and personnel as well as information systems. I asked him how often the committee meets and whether I could sit in on a meeting.

Bad news: They meet annually, and I had just missed the meeting. So, what issues had they addressed? The chairman's most urgent concern

was that many employees are getting up in years; the committee decided to recommend to the agency administrator (in private-sector terms, this is the equivalent of a division president) that a defibrillator be purchased in case someone had a heart attack. OK, I could see that the safety committee wasn't going to be much help.

Working on my own, I completed the contingency planning road map and began to identify the major information systems. I was pulling together an inventory and identifying

where confidential data resided outside the major information systems—all in all, having a great time—when it occurred to me that I just might want to make sure that my business-impact assessment and individual disaster recovery plans for the major information systems aligned with the larger government picture.

That's when I got the bright idea to boldly go where no woman has gone before and

e-mail the chief information security officer for the state. I had met the guy once and thought he seemed a little wet behind the ears; I figured he would probably welcome my expertise on one of his committees. Wrong.

The CISO called my desk phone immediately. I thought that was a good sign. We scheduled a meeting, and I took my boss along for this auspicious occasion. The two of us wound our way back to the CISO's office after receiving visitor badges. The CISO was in a meeting with some people, but when he saw us, he summarily dismissed that group and welcomed us into his office.

Although young, he was an imposing figure in height and build, and he made an impression with his bleached white teeth, styled hair, big brown eyes and great smile.

His office walls were adorned with military paraphernalia, including two framed arrangements of medals. I thought they couldn't be his, given his age, but perhaps he came from a military family and the two sets of medals were his father's and grandfather's. I was thinking, "Oh great, the good ol' boys club," but I decided to reserve judgment.

Explaining the Obvious

I was also thinking that this was probably the CISO's first really big job. My boss and I have vast experience managing multimillion-dollar budgets, but we sat in our chairs while this fellow huffed and puffed about his importance.

He told us stories that gave him credit for bringing the state up to speed on the IT security front, and then he began drawing diagrams on his whiteboard showing how

he had single-handedly "re-architected" the network for better security. He drew little squares and arrows as he explained how he had created a DMZ.

My boss and I have many years of experience in three-tiered architectures utilizing multiple DMZs, but the CISO kept stopping and turning around to make sure that we understood and speaking to us as if we were kindergartners. I knew that my feelings—impatience, annoyance and embarrassment for the CISO among them—were showing on my face, so I began shuffling the papers in my lap as I tried to avoid the CISO's gaze.

"You appear to not be happy with my architecture," he said to me.

And that was when I blew it politically. I chirped up with, "Oh no, your architecture direction is good. That is the way it should be. My expression was probably one of boredom more than anything else."

He blinked as if he wasn't sure he had heard me right. My boss tried to steer the conversation to a topic of concern that he needed the CISO's help on. While they continued their discussion, I tried to figure out if there was any way I could save myself on this one. Probably not, but I decided it didn't matter, since I thought the guy was a pompous ass without much experience.

Why should I care if he likes me (aside from the fact that I'd rather not have to look for yet another new job soon)? I know this is going to come back to haunt me one of these days. But when that day comes, we'll probably be the only agency in the entire state system with a full contingency plan in place. I can feel good about that. ■

WHAT DO YOU THINK?

This week's journal is written by a real security manager, "C.J. Kelly," whose name and employer have been disguised for obvious reasons. Contact her at mscjkelly@yahoo.com, or join the discussion in our forum: [QuickLink a1590](#)

To find a complete archive of our Security Manager's Journals, go online to computerworld.com/secjournal

SECURITY LOG

Phishing Lures Up

The number of phishing e-mails grew by 42% last month, according to the latest report from the Anti-Phishing Working Group (APWG). In January, 12,845 completely new phishing e-mails were reported to the APWG. The APWG statistics also reveal that the number of unique phishing Web sites went up by 47%, from 1,740 to 2,560. The group states that up to 5% of recipients have fallen prey to the scams in any recent month—a far better return for criminals than most other online scams. Another aspect of the crime is the continued use of non-Port 80 HTTP servers to evade detection. Such servers are relatively rare but in January accounted for 9.5% of the servers involved in phishing.

Handy Identity

Fujitsu Computer Systems Corp. is launching what it claims is the world's first biometric palm scanner. The Palm Vein Identification System verifies identity by scanning the pattern of veins in a person's hand, which show up clearly when bombarded with near-infrared rays. Specifically, the deoxygenated hemoglobin running through the veins absorbs the rays, creating a bright "reflected" vein image, according to Sunnyvale, Calif.-based Fujitsu. Vein patterns are said not to vary over a lifetime and are unique. They are also impossible to tamper with.

USB Detective

Tel Aviv-based Safend Ltd. has announced the availability of auditing software that identifies all Universal Serial Bus products connected to PCs enterprise-wide. USB Auditor, available as a free download for a limited time from Safend's Web site, creates a report displaying all devices currently and recently connected to the network. The report can be exported to a Microsoft Excel file.

I got the bright idea to boldly go where no woman has gone before and e-mail the chief information security officer for the state.

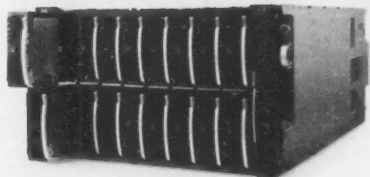


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BRIEFS

RippleTech Unveils Sarb-Ox Software

■ RippleTech Inc., a Conshohocken, Pa.-based provider of security, compliance and systems management software, has introduced LogCaster for Sarbanes-Oxley, an event-log consolidation system designed to help corporate executives view their compliance with Section 404 of the Sarbanes-Oxley Act. The software's user interface provides required reports on internal financial controls while helping to identify other areas of potential risk, said RippleTech. Pricing starts at \$550 per server, with a minimum configuration of five servers. LogCaster monitors and manages a broad range of technologies, including Windows, Unix and Linux operating systems, as well as firewalls, Web servers and databases.

CA Announces Doc Management Apps

■ Computer Associates International Inc. announced three new Unicenter software products for storing, viewing, printing and distributing documents. All three—Unicenter CA-Spool Print Management r11, Unicenter CA-View r11 and Unicenter CA-Deliver r11—work with z/OS mainframes and distributed systems. They were demonstrated at the Share Technology Exchange last week. Pricing was not announced.

Corel Releases Tech Graphics Suite

■ Ottawa-based Corel Corp. has unveiled Corel Designer Technical Suite 12 for technical graphics professionals. New and enhanced features include a Projected Drawing Mode and Dynamic Guides to enable users to create drawings faster and more precisely than they could with earlier versions, said Corel. The \$699 suite (\$299 for an upgrade), which will be available this month, also includes drawing, image-editing, graphics-conversion and screen-capture applications.

MARK WILLOUGHBY

Moving Toward Self-awareness

IN THE BEGINNING, there was management and security. By today's standards, they were relatively unsophisticated—the management of a host system and the security of its users.

Then came the network. It had to be monitored and controlled to orchestrate all the devices

sending packets around. The network also introduced the concept of perimeter security to make sure only authorized users could access the trusted resources.

From these humble beginnings, security and management have spiraled into layer upon layer of complexity as we accelerate toward the adaptive enterprise vision. The Information Age is all about always-on, on-demand resources and utility computing. Consider the crowded management milieu today. We have, to name a few, the management of services, infrastructure, storage, configurations, data centers, traffic, applications, devices of all types, content and compliance, as well as security and identities.

Security and identity management crosses into the security zone. Here the pace of innovation is driven wildly by malfeasance, misfeasance and nonfeasance. The issues that matter here are security for users, storage, configurations, data, applications, devices of all types and content—the list starts to resemble the one for management.

Much is being written about how the overlap is blurring the historic divide between management and security. Configurations are now a chicken-and-egg dialectic of tight management for strong security versus tight security for strong management. Software patches must be automatically distributed, installed and tested to buttress security on millions of devices around the globe. Network



MARK WILLOUGHBY, CISSP, is a 20-year IT industry veteran and journalist. He has tracked security and risk management slants for seven years and is a managing consultant at MessagingGroup, a Denver-based firm specializing in content development. He can be reached at mark@msggroup.com.

traffic must be monitored to thwart debilitating denial-of-service attacks.

There's no end in sight as autonomic computing gains momentum. But getting to this goal of the on-demand, always-on information infrastructure is going to require new capabilities beyond today's relatively crude management and security tools.

The tools we use for management and security are mostly empirical. We watch and accumulate information so we can react to or, preferably, anticipate situations. The sheer volume of data that must be monitored across the autonomic infrastructure will render empirical management impractical.

Smart vendors, seeking competitive advantage, are adding modeling capabilities to put more intelligence into the adaptive infrastructure. Modeling is the key ingredient for an intelligent infrastructure capable of quickly scaling to meet the demands of change.

These first tools mostly bring deductive reasoning for "what-if" modeling to support the first generation of adaptive infrastructure. What-if modeling predicts the impact of changes to some discrete element buried inside a layer of the information infrastructure. Sophisticated deductive modeling considers the result of changes in two or even three variables. Real-world applications of this have brought us relatively well-behaved systems, albeit ones with fewer variables than the adaptive infrastructure, such as

those capable of planning peak water usage during the Super Bowl or managing telephone networks on Mother's Day.

Deductive modeling tools are an intermediate step. They aren't sufficiently powerful or sophisticated to make multivariate decisions across all the myriad elements and layers in the always-on, on-demand infrastructure. As we increase our understanding of the interactions and dependencies, we will acquire the knowledge to do inductive modeling, the more elegant solution.

Inductive modeling goes by the street name predictive modeling and may be the real deal for managing and securing all those elements and layers in the information utility. Predictive modeling is already a hot market for predicting multivariate events in health care, business, air traffic control and meteorology.

Predictive modeling requires a good understanding of the problem and a lot of data, which we're acquiring now for the information utility. The big difference is that predictive modeling starts with the desired outcome. You plug in the number of users you must support under given application workload, and the model returns the optimal configurations for all the elements in all the layers of the infrastructure.

There's no guessing on how storage throughput impacts application performance. The system has the historical data and intelligence to model the impact of cross-domain security and to make adjustments. Neural networks and artificial intelligence agents can monitor critical elements and learn from changes. They train themselves to make rational decisions when faced with complex situations involving many variables.

The predictive infrastructure is "self-aware," a term made famous in the Terminator movies. To make the technology work, we humans must give up the notion of control, for better or worse. **Q 52842**

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How to use defects to bring developers and testers closer together. By Michael Kelly

IT'S SAFE TO SAY that developers and testers are guided by different motives, pressures and perspectives. Developers are motivated to complete code quickly and accurately and move on to the next problem. Testers are required to find and report problems within the system

IT MENTOR

quickly. Someone should be urging developers to improve the quality of the code they create or modify, but that often takes a back seat to "more code, faster." And someone should be inspiring testers to find more-meaningful bugs, but I rarely see that happening.

In the course of a project, the more defects testers find and submit to developers, the less time developers have to work on them, and communication may break down. Members of the project team commonly start to rely on



Testing consultant **MICHAEL KELLY** says a partnership is needed to create good software.

Bonding Over BUGS

entering short descriptions and comments into a defect-tracking system as a means of communication. This often leads to misunderstandings and unnecessary tension between the two groups. I have found some techniques that can improve communication between testers and developers and help them fix problems faster.

SHARE AUTOMATED TESTS BETWEEN TEAMS

Test teams often develop system-level test scripts using commercial tools, and developers frequently design unit-level test scripts using open-source frameworks. If your project team isn't doing either, ask them why. There are plenty of good reasons not to use automation, but make sure the teams have at least considered it. If either team has automated tests, get them to start sharing.

Sharing test scripts gets everyone on the teams using the same tools and languages. That makes developers more likely to offer improvements to the scripts and testers more inclined to offer advice on data selection and common test patterns. Sharing test scripts also minimizes redundancy and typically leads to increased test coverage. The more testers and developers collaborate, the more powerful both their scripts become. Microsoft Corp., IBM and others have excellent integrated development environments built for this type of collaboration.

DISTRIBUTE THE ABILITY TO EXECUTE SMOKE TESTS

Every time developers compile code (often referred to as a "build"), there's the potential for something to go wrong. To detect a bad build early, it's helpful to create a series of preliminary tests — commonly called smoke tests — that exercise the system from end to end. A smoke test doesn't have to be exhaustive, but it should be capable of exposing major problems. If the build fails the smoke test, the developers will probably need to go back to the code to debug and find the problem.

If you don't have a smoke test, create one. If it's not automated, automate it. Automated smoke tests are particularly powerful for the following reasons:

- They're used often, possibly many times a day.
- They provide meaningful information, such as whether the system is at an acceptable state for testing and all services are up — or not.
- They provide feedback quickly, typically in minutes.
- They're easy to execute and distribute.

The easiest way to ensure that a smoke test is executed is to include it in the build process. Make the smoke test available to both testers and developers through a central interface such as a project Web site or a test management tool. Not only does this get everyone using the same tools, but it can also get developers and testers collaborating on script development and maintenance.

PERFORM RUNTIME ANALYSIS TOGETHER

I've found that sharing runtime analysis is one of the most effective ways to increase developer/tester communication.

Runtime analysis is just what it sounds like: an analysis of the code as it's executing. It can provide information on things like execution paths, code coverage, memory errors and leaks, performance and bottlenecks, and threading problems.

For example, on one project, we had a problem with pages taking more than 60 seconds to load. We ran numerous performance tests and couldn't isolate the problem. Then, using a runtime analysis technique, the testing team found that a call was being executed 4 million times when a page loaded. Armed with that information, an architect fixed the problem the next day.

There are many very good open-source and commercial runtime analysis tools, but it's still a difficult

and thankless job. I've found that the most effective way to make sure that runtime analysis gets done is to have testers do it. Your testers don't need to become runtime analysis experts. They just need to learn the basics about some tools, learn a little about the problems common to the technologies they're testing and find some time to actually do the testing. As the testers begin to discover problems, developers will begin to try to prevent those problems — and that will require them to use the tools themselves.

As a tester, I like to show a developer what I've found with my limited runtime analysis. When I do so, the developer no longer sees me as a technology-blind tester who doesn't know anything about development, and he'll likely be interested in helping me understand what I'm seeing. Once a developer knows that a tester has the desire and the aptitude to learn, he typically is willing to spend time helping the tester understand the applicable technologies. From the developer's point of view, explaining the technologies once early in the project saves him from having to answer many small questions later. At the very least, the tester gains a basic understanding from which to ask smarter and more meaningful questions.

When developers and testers work together with a runtime analysis tool, testers can share information on the risks and long-term effects of not

fixing problems. Developers can educate testers on the technical aspects of the application technology and project environment. Together, they can uncover and refine performance requirements while learning new skills.

USE LOG FILES TO ISOLATE PROBLEMS

A simple technique for capturing bugs and debugging is to leverage log files. These are the files developers create at runtime that contain information about things like server and software activity and performance, as well as any problems that may be occurring. Often, when a problem happens behind the scenes of an application, it won't manifest on the user interface. For example, most Java exceptions don't appear on-screen. But if developers give testers access to the execution log files for the application, the testers can use scripts to parse through the log files, looking for abnormalities and exceptions. Once developers know what the testers are looking for, they may be more willing to take the time to write this information to the log files in a common format for testers to parse.

USE DEFECT-TRACKING SYSTEMS EFFECTIVELY

Your project team probably uses some form of automated defect-tracking system. Developers should tell testers what specific information in a defect report or "ticket" is most helpful. This enables testers to provide the right type and amount of information, such as screenshots, source code, steps taken or a script test case that can reproduce the bug, as well as any relevant log files.

Testers and developers should also work out a defect-prioritization scheme. Without one, developers may miss serious problems while sorting through lots of reports of little bugs that the customer is unlikely to encounter. By prioritizing defects, you ensure that critical bugs get fixed immediately and small problems get attention when time is available.

Creating good software requires a partnership between testers and developers. Most developers and testers want to help in any way they can, assuming that they're given time to do so. It's up to each group to let the others know what they need, and it's up to you, as manager, to make sure they have that time. **52679**

Kelly is a testing consultant at Fusion Alliance in Indianapolis. Contact him at Mike@MichaelDKelly.com.

FaceToFace

BUG-TRACKING TOOLS are great for organizing software development issues and managing what goes into each release, but by removing the need for face-to-face contact, they can become a barrier to communication between developers and testers. However necessary these tools may be, it's important to understand that they can't replace more effective means of communication.

There's no substitute for talking face to face. Asking questions, reading body language and building rapport all help to create open and effective communication. When I encounter a possible defect, I often show the problem to a developer before I write the defect ticket. That strategy helps in the following ways:

- I may find that the developer is already aware of the problem.
- The developer can confirm that the problem is not caused by some setting or

incorrect configuration; it's actually a bug.

- The developer sees the bug, so it's compelling.

- The developer can reproduce the problem more easily.

- The developer can request inclusion of additional information on the ticket to help jog his memory.

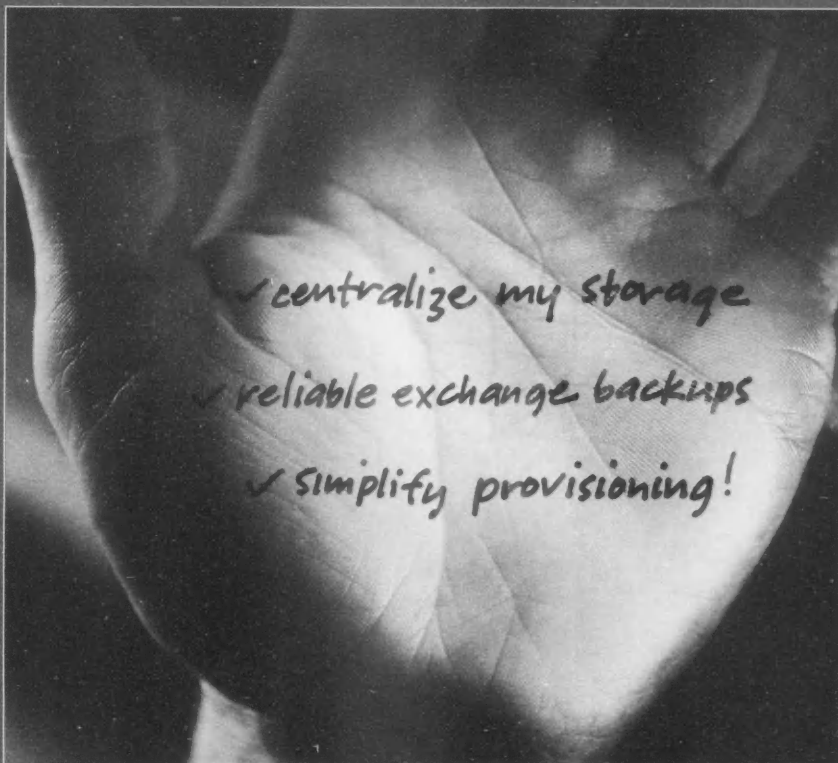
- The developer may be able to specify the person best suited to work on this problem.

- By watching the developer interact with the bug, I may discover other areas I need to test that might not have occurred to me otherwise.

Make sure your project environment is organized so that this type of interaction can take place. Think about where the testers sit in relation to the developers. Are they within walking distance? They should be.

—Michael Kelly

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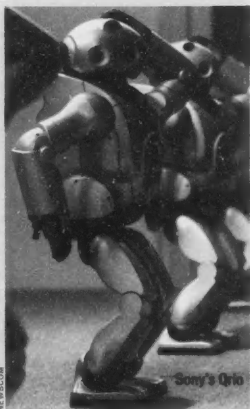
ThinkTank

BRAIN FOOD FOR IT EXECUTIVES

Get Back in Touch With Your Inner Geek

Are you getting a little out of touch with new technologies? "It's too easy [for CIOs] to lose direct contact with technology, and the judgment of internal and external experts is not always sufficient," says a team of Gartner Inc. analysts. "To understand some technologies demands personal experience," they say in a bulletin about must-do resolutions for the CIO. Gartner urges CIOs to get hands-on experience or see a live demonstration of the following technologies by mid-2005:

- Networked gaming (think Xbox), to "learn how your next generation of employees is being 'wired.'"
- A business process diagramming tool and a Business Process Execution Language orchestration server.



■ A wiki, which is a server program that lets users collaborate when writing Web content, to "see the power of simplicity and transparency in collaboration, open-source style."

■ A sleek Nokia 7280 cell phone, a product that combines aesthetic design with high-tech engineering.

■ The voice-over-IP service from Skype Technologies SA, to "see an example of why business colleagues might start to demand VoIP."

■ An electronic marketplace like www.innovationfutures.com or www.biz.uiowa.edu/iem.

■ A high-speed 3G data card for your laptop.

■ An advanced robot like Sony Corp.'s Qrio, which can walk, dance and run.

Q 52723

— Mitch Betts

Best Bits

The most useful parts of recent business and IT management books.



THE BOOK: *Innovating IT: Transforming IT From Cost Crunchers to Growth Drivers*, by Lior Arussy (Wiley Publishing Inc., 2005).

First, a plea to book authors: Can we dispense with the phrase "IT is at a crossroads," which shows up in almost every IT management book these days? IT management is always at a crossroads, at the corner of Success and Failure.

Fortunately, this book has some fresh ideas about how IT leaders can reinvent the IT function as something more than just managing PCs, servers and storage, which is the path to becoming a replaceable utility. Arussy, focusing on the middle word in the title "chief information officer," says CIOs "must become responsible for a product, and that product is information." He says IT will have to act like a business, customize the information product for different

segments of customers (end users) and work to increase "information utilization" among users who have the biggest impact on building the business.

Arussy also has some thought-provoking comments on how IT can support innovation. If you're ready to emerge from the doldrums and drudgery of cost-cutting, this could be an inspiring read. — Mitch Betts

Hot Jobs

Starting salaries of some of the most in-demand executive positions:

Chief compliance officer	\$350k
Forensic CFO	\$300k
Chief RFID strategist	\$250k
Chief security officer	\$200k
City CIO	\$60k

SOURCE: CHRISTIAN & TIMBERS, CLEVELAND AND GRIFFIN CO., FEBRUARY 2005

Things to Ponder

■ **Will instant messaging surpass e-mail as the preferred form of business communication?** Sage Research Inc. in Natick, Mass., asked 96 IT decision-makers in U.S. businesses, and 41% of the respondents said it'll never happen. But 12% said it will happen within the next year, and 23% predicted within the next three years.

■ **Consumer Web sites provide a much better visitor experience than business-to-business sites do**, according to a Forrester Research Inc. report titled "B2B Web Sites Fail the Usability Test." The report points to navigation problems and extremely slow page loading.

■ **Hundreds of U.S. colleges are offering online courses in homeland security**, according to *The Chronicle of Higher Education* in Washington. The popular programs cover security, terrorist attacks, critical infrastructure and risk assessments.

GOT ANY BRIGHT IDEAS? Send them to pitches@computerworld.com.

The IT Economy

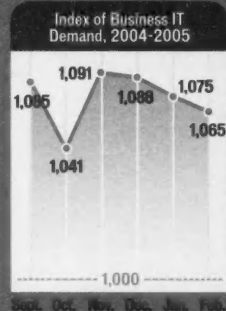
■ **Vendor consolidation** is certainly one of the megatrends of the IT economy today. So how do CIOs feel about that? Merrill Lynch & Co. recently asked 100 CIOs, and 51% of the respondents said they're against vendor mergers, 37% said they support mergers, and 12% said they're unsure. The primary concern of the critics is that mergers will result in a decrease in competition. Other concerns included higher maintenance costs and less innovation.

■ **There's no end in sight to the merger mania**, according to Simon Heap, a partner at Bain & Co.'s San Francisco office. "Two out of every three software companies didn't show profits in 2003, making them more vulnerable as acquisition targets," he says. "The inevitable outcome: fewer and stronger players."

■ **Spam now costs \$21 billion annually in lost productivity in the U.S.**, according to a study by the University of Maryland's business school in College Park.

Buying Intentions

IDC researchers say their index of business IT demand (below) shows that user spending expectations have dipped yet again, as buyers' attitudes simply become more realistic.



The buyer intent index is based on monthly surveys of 400 to 500 U.S. CIOs and business executives, who are asked about their IT spending expectations for the next 12 months. Results are weighted to be representative of the U.S. market. An index of 1,000 means zero growth. *Caution: Buying intentions don't always lead to real spending.*

SOURCE: IDC FUTURESCAPE, FRAMINGHAM, MASS., FEBRUARY 2005

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EXEC TRACK

Euro RSCG Promotes Tanner

Euro RSCG Worldwide, a global communications agency based in New York, announced the appointment of JOHN TANNER as CIO. He will report to Chief Financial Officer Andre Pinto. Tanner had been Euro's director of IT infrastructure since 2001. Previously, he was vice president of networking and acting chief operating officer at Consonus Inc. He also built and then sold an entrepreneurial venture called Network Engineering Inc.

Carroll Picked as Ohio's Interim CIO

Ohio Gov. Bob Taft announced that MARY F. CARROLL will serve as the interim state CIO. The Cabinet-level position oversees the state's Office of Information Technology. Carroll previously served as deputy state CIO for the investment and governance division of the Office of Information Technology.

Bostick to Head IT at Conseco

Conseco Inc., an insurance company in Carmel, Ind., has named RUSSELL M. BOSTICK executive vice president and CIO. Bostick joins Conseco from Chase Insurance, an arm of J.P. Morgan Chase & Co., where he was chief technology officer. He has also held key technology positions at Corporate Software & Technology, CNA Insurance and IBM.

CSS Industries Names Morris CIO

RICHARD L. MORRIS has joined CSS Industries Inc., a consumer products company in Philadelphia, as vice president and CIO. Morris reports to CEO David J.M. Erskine. Previously, Morris was managing director at Xerox Technology Solutions, and he also served as CIO at Exide Corp., BetzDearborn Inc. and PerkinElmer Inc.

PAUL GLEN

Are You a Scary Boss?

I'LL NEVER FORGET the first time I learned that one of my subordinates was afraid of me.

A talented young man, probably 26, had just left my office after explaining to me how happy he was with his current project. My assistant came in and told me that he had spent the 20 minutes prior to our appointment complaining to her about how terrible his project was and how miserable he felt.

I was absolutely incredulous. Why would he lie to me? What was the point? I was the one person who could help him, if only he asked for help. I asked my assistant, "Why he would do that?"

"He's afraid of you," she said matter-of-factly. The words hung there in the air for a minute as I tried to absorb their meaning. Someone was afraid of me — of me. It was unfathomable.

It certainly didn't fit my self-image. I was 27, short, introverted, quiet and intimidated by my new job managing 50 people, mostly older than me. What's to be afraid of? It seemed more plausible that I should be afraid of him rather than the reverse.

But there it was. I was the scary boss.

Over the years, I've seen a lot of managers who have been regarded as terrifying by their staffs. I'm not sure how many realized it, but I suspect that most of them probably never knew the degree to which they were considered frightening, intimidating or just plain mean.

What makes someone a scary boss? Are you one of them? Here are a few of the things that tend to foster that impression.



PAUL GLEN is an IT management consultant in Los Angeles and the author of the award-winning book *Leading Geeks: How to Manage and Lead the People Who Deliver Technology* (Jossey-Bass Pfeiffer, 2003; www.leadinggeeks.com). He can be reached at info@2-consulting.com.

Position. Sometimes, just having the boss title is enough to make you scary. The fact that you have the power to hire, fire and grant raises and bonuses makes you a menacing figure.

Unpredictability. If people can't reasonably anticipate your response to a situation, they naturally assume the worst. IT professionals are well-trained symbolic thinkers. Their education, and comfort, is rooted in the deterministic. "If I put a 3 in that field, I know that the algorithm says that the answer will always be a 12."

Random responses to the same stimuli mean only one thing to technical folks: bugs. If you as a manager are unpredictable, clearly you are a bug in your own departmental system.

Volatility. Even the most predictable manager can be emotionally volatile. An unbridled temper is never a comfort to one's staff. In some ways this is like unpredictability. If your mood or other events occasionally affect your responses to situations, then you

might be scary all of the time.

Mistrust of staff. If through word or deed you regularly display mistrust of or contempt for staff, presenting things to you will likely be a scary experience. Mistrust can be communicated in myriad subtle ways. Some managers ask lots of rudimentary questions of the staff, displaying disdain for their abilities. Others ask endless, aggressive, prosecutorial questions that suggest a hunt for some deliberately concealed truth.

Hoarding of information. Supervisors known for not sharing valuable information frustrate and frighten their staffs. Hoarding suggests that the boss is either power-hungry and self-serving or oblivious and incompetent. Neither interpretation is comforting.

Not protecting staff. One of the things that subordinates reasonably expect from their supervisors is protection from external forces. If someone in the group gets fired every time the boss's boss throws a temper tantrum, then people feel unduly exposed to the political elements. It's as if every deckhand on a sailing vessel felt compelled to keep an eye on the weather because the captain wasn't trustworthy.

As for the guy who wouldn't tell me about his crappy project, I eventually discovered that he was both afraid of my position and angry at me for having it. He had wanted the job, but it had been offered to me. So he was afraid of me for reasons having almost nothing to do with me personally. But it didn't matter; I had become the scary boss.

If you want to encourage the development of mutual trust that encourages productivity, it's important to know: Are you one, too? **52678**

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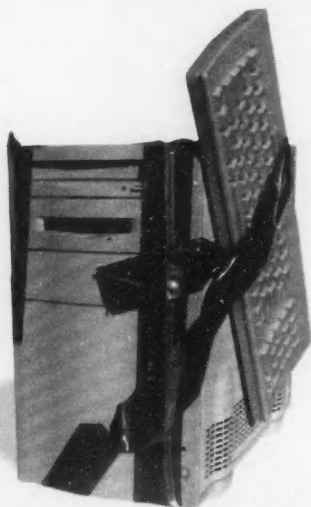
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Online Security

something that our customers needed to make them feel comfortable about doing e-commerce," he said.

Increasingly, companies are being pushed to implement measures to rebuild consumer trust in the face of continued online attacks, said Robert Garigue, chief information security officer at the Bank of Montreal in Toronto.

"There's a lot of pressure to respond," said Garigue. "What we are seeing here is the issue of risk evolving from an internal technical concern to a trust-relationship issue."

In a poll of about 5,600 households conducted in December by Forrester Research Inc., 26% of the online consumers said e-mail fraud concerns had stopped them from applying for a financial prod-

uct, while 14% said they had quit accessing accounts or paying bills online. Another 20% said they don't open e-mail that looks like it came from their financial institutions because of worries about phishing attacks.

Such consumer angst is forcing companies to consider new identity, usage, service and privacy assurance measures, said Jonathan Penn, author of the Forrester report.

Some have already taken action. Since last fall, America Online Inc. has offered its customers two-factor authentication based on token technology from RSA Security Inc. AOL is also offering antivirus, firewall and antispyware tools without charge to subscribers, a spokesman said.

Similarly, to help protect its customers against phishers, eBay Inc. is using Austin-based WholeSecurity Inc.'s Web Caller-ID technology to

Paying the Price

A lack of online security can:

- Slow adoption of online financial services. Concerns over privacy and security of personal information are major deterrents to using online banking and bill-payment services.
- Curb the effectiveness of e-mail as a marketing tool. Fears of phishing and spoofed messages are making users less inclined to open e-mails.

SOURCE: FORRESTER RESEARCH INC., JANUARY 2005

let users verify the authenticity of a Web site via a downloadable browser plug-in.

The Stanford Federal Credit Union (SFCU) has implemented technology from Passmark Security Inc. in Redwood City, Calif., that proves to customers that they have logged onto the SFCU Web site and not a fraudulent site.

All customers are provided

with a secret image and phrase that are displayed during the log-on process and throughout the entire transaction. The images — unique to each customer — confirm the authenticity of the site, said Sam Tuohy, chief technology officer at Palo Alto, Calif.-based SFCU.

U.S. banks and other financial services companies have traditionally been reluctant to implement new security measures for fear of driving customers away, said Avivah Litan, an analyst at Gartner Inc. Cost has been another concern, she added.

But that may change as consumers demand stronger protection from their financial services firms, Litan said.

In an April 2004 Gartner survey of 5,000 U.S. consumers, 60% of the respondents said they wanted the option of using additional security mechanisms for online transactions, while 19% said

they wanted added protection as a condition of doing business with a company.

In light of that, Gartner predicts that by the end of 2007, up to 75% of U.S. banks will use an authentication method that's stronger than a simple password. Through the same period, up to 7% of U.S. banks and 70% worldwide will be mandating the use of hardware tokens for customer authentication, the report predicted.

"This notion of balancing security with convenience is an absolutely valid idea, but it needs to be revisited," Penn said. He added that security "is a much bigger issue now" than it was before. **52974**

RETAILERS TRY HARDER

Well-publicized identity theft and data-loss incidents are forcing online retailers to invest in back-end tools to curb the cost of fraud.

QuickLink 52975
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Tape Mishap

said Bo Coughlin, vice president of the commercial services division at Time Warner Cable in Stamford, Conn. "I don't want Johnny to give a tape to Stevie, who then gives it to Paul, who puts it in his truck to transport it."

Coughlin is overseeing a project to offer subscribers a fully managed, WAN-based backup system to a central repository run by Arsenal Digital Solutions Worldwide Inc. in Cary, N.C. The company is also testing the Arsenal system for internal use, he said.

Coincidentally, Coughlin said he recently received a letter from Charlotte, N.C.-based Bank of America warning him that his personal account information may have been compromised.

Bank of America said it notified the U.S. Department of Defense and the General Ser-

vices Administration on Feb. 26 that "a few" tapes containing account information for customers of the GSA's SmartPay travel cards were missing. Bank of America spokeswoman Alex Trower said the tapes were part of a larger shipment of media being sent to a backup data center. She wouldn't say if the tapes were stolen or whether the data was encrypted.

Turning to Technology

Bank of America isn't alone.

Richard Fischer, an attorney at San Francisco-based Morrison & Foerster LLP, devotes most of his time to financial privacy issues. He said that in the past three weeks, he has dealt with six cases involving banks whose customer information was compromised.

"Without any question, the banks have been under the microscope [of regulators] and have improved the security of systems," he said. "The problem is, the bad guys keep get-

ting better too. The only solution is more technology."

Paul Rivard, director of IT at Commerce Bancorp Inc., a \$1.2 billion company in Cherry Hill, N.J., said he moved away from tape backup for most of his servers three years ago and began backup over a WAN using third-party service provider AmeriVault Corp. in Waltham, Mass.

"We don't have to track all these tapes coming from branches to a central location," Rivard said. "Not only is there greater peace of mind, but we don't have the regulators . . . and we don't have to account for tapes in transit, the couriers and missed pickups."

Rivard said he believes that tape backup won't fully go away anytime soon because of the need for long-term archiving but that banks need to take advantage of better methods of securing that data. For example, Rivard began encrypting data on his tapes four years ago at the sugges-

tion of a private auditor.

Bill Bradway, an analyst at IDC's Financial Insights unit in Framingham, Mass., predicted that Bank of America will likely put together a team that includes its CIO, chief security officer and chief risk officer to strengthen processes and procedures for ensuring that backup data is safe. The bank will likely move toward transmitting backup data through high-bandwidth networks without the use of tapes, he said.

Regulatory Backlash

In the meantime, Bradway said, companies should brace for the regulatory backlash.

Last week, Senate Banking Committee member Jon Corzine (D-N.J.) said he called on Committee Chairman Richard Shelby (R-Ala.) and ranking member Paul Sarbanes (D-Md.) to hold hearings on the issue of identity theft as soon as possible. Corzine has for the past two

years introduced a measure that would require companies to notify the public when sensitive data is compromised.

A spokesman for Corzine said the proposed Privacy Breach Notification Act addresses the lack of notification for "individuals who may have been affected by ChoicePoint and Bank of America."

Bank of America's Trower said that the missing packages and the tapes were "unidentifiable" and that there was nothing on the packages to indicate who they belonged to or where they were going.

"It would require highly sophisticated hardware and software and specific user information to access the data on the tapes," she said.

Trower wouldn't say if the tapes were being handled by a third-party archival service or whether Bank of America is considering changing its procedures for backing up data from physical tapes to high-speed data networks. **52928**

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FRANK HAYES ■ FRANKLY SPEAKING

E-health, Stat!

SETTING THE RECORD STRAIGHT: Ray Noorda probably has Alzheimer's. I discounted rumors to that effect when I wrote my column on Noorda's lawsuit to regain control of The Canopy Group, the investment company he founded [QuickLink 52364]. But in a recent court filing, Noorda's own lawyers refer to "the apparent onset of Alzheimer's disease." No word on how much the disease has affected Noorda, but his medical records have been demanded by the other side in the lawsuit.

What will they get? Most likely, a pile of paper.

Paper is still the common currency of medical records. Sure, hospitals have been buying technology for what are now called electronic health records (EHR) for more than a decade. EHR is a priority for Dr. David J. Brailer, the new national coordinator for health information technology. There are even well-funded multiorganization EHR pilot projects — one in Massachusetts gets rolling this month.

So why will paper remain king for another decade or more, according to analysts?

The usual reasons given are cost, user resistance and lack of interoperability. But those excuses don't wash.

Cost? Estimates for implementing EHRs top out at \$12 billion per year. That's about \$40 per American — less than \$4 per month. That's no showstopper.

User resistance? Lots of doctors and nurses say they don't like the idea of more computers getting in the way. But once they actually see test results faster, read patient notes that aren't incomprehensibly scribbled and never have to wonder what's missing from a file, they almost always fall in love with the new systems.

Lack of interoperability? True, EHR vendors aren't big on connecting with their competitors' offerings. But interoperability is no black art. This isn't a technology issue. When customers — or government regulators — demand interoperability, we'll get it.

So what's the real problem? Inertia. There's no reason for urgency, nothing forcing health care players to move fast on EHR. Which is why we could spend the next decade watching EHR pilot projects tentatively trying different approaches to see what sort of EHR might work, while the rest of us remain neck-deep in paper medical records.

Or we could do what we already

know works — and get there a lot faster.

What would that take? A Ford. Or a Sears. Or a Wal-Mart.

Back in the 1980s, Ford and Sears forced their suppliers to adopt electronic data interchange — and EDI took off. Twenty years later, Wal-Mart used the same threat with suppliers about RFID: Adopt this technology, or we won't buy from you. Now RFID is flying.

Until some big player cracks the whip, everyone just shuffles around with a new technology. Once the whip cracks, everyone falls into line. True for EDI and RFID — and true for EHR.

Big whip-cracking players also define implementations. Not architectures, not standards — implementations. If it doesn't work with the whip-cracker's version of EDI or RFID, it's useless. Same for EHR.

If we want to climb out of the paper pit fast, we need someone to crack the EHR whip.

But who? Insurance companies could do it, but they won't. They'd save on paper handling but lose their excuse for not making payments quickly. Hospitals and HMOs already have EHR systems, but none is big enough to force standardization and interoperability. Big companies that pay for medical benefits are too far out of the loop to dictate technology.

But one whip-cracker is big enough and central enough and controls enough money. It even has some new initiatives that EHR would fit perfectly. If anyone will make it happen fast, this player is the one who will do it.

So keep an eye on those EHR pilots. They should be interesting for anyone who deals with medical records. Don't be fooled, though; they're still just shuffling around, surrounded by paper.

But when Medicare cracks the whip, then we'll get EHR. **52932**



FRANK HAYES, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

Who Loves You, Baby?

This pilot fish is interviewing job candidates, and one of his favorite questions for understanding how people handle crisis situations is, "Tell me about your worst day." But when he asks one job seeker, the response is, "Three words: I love you." Says fish, "I turned to the HR staffer sitting on interviews with me and explained that 'I love you' was the name of a computer virus. She was relieved that this interviewee had, in fact, not just proclaimed his love for me."

Wrong!

"I've been trying to send an e-mail to this guy," user complains, "and it keeps coming back saying the domain doesn't have any such e-mail address. But I know it's right." Pilot fish suggests user call to verify the address, and a few minutes later, irate user has conferred in the would-be recipient. Fish asks him to spell out his e-mail address. But halfway through, user interrupts: "No, wait — that's not how you spell it!"

SHARK TANK

Hard Concept

End user calls the help desk with a PC

problem, and the tech's standard troubleshooting doesn't seem to help.

"Finally, as a last resort, the tech tells the user to 'hard boot' the system," says a pilot fish on the scene. "Confused, the user asks, 'What's a hard boot?' The tech says, 'Push in on the CPU's power button really hard and then release it. Now log back into the system. . . .'"

Not Dead Yet

Just after a custom application is rolled out, this user sees a message pop up on his screen: *We are dead. We are all dead.* "The user created a screen print and handed it to his manager, who immediately escalated it to the security department," reports a pilot fish in the know. Security is about to call the police about the apparent death threat when someone thinks to ask the application's programmers if they know anything about it. "An emergency release of the software was created," fish reports, "with a more meaningful error message."

Get the Hint?

Pilot fish receives online survey for evaluating his team and his new boss. "We were assured that the results were anonymous, even though we were to send the survey back to our boss via e-mail," grumbles fish. "To add insult to injury, when I opened the survey, I found two questions already answered. The first one, 'I feel the team gets projects done well,' was marked 'inclined to disagree.' The second one was, 'I feel the manager has the knowledge and drive to lead the team to success.' This was marked 'I agree.'"

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